IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication DECEMBER 7, 1961

★ Under Secretary of State George W. Ball:

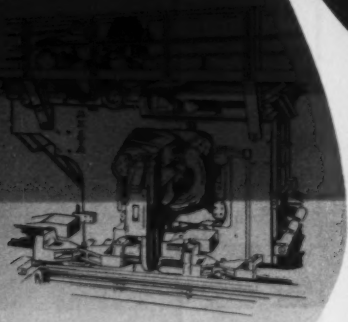
The Coming Battle On Foreign Trade p. 83

Foundries Fight Price Squeeze p. 86

Computer Trims Waste in Hot Mill p. 113

Digest of the Week p. 2-3

MESTA 40" Continuous Hot Strip with Flashing Stands operating at Fairless Works, U. S. Steel Corporation



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KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Cold-Finishing of Alloy Steels: The Cold-Drawing of Bars

Cold-finishing of alloy bars may be divided into two general categories: (1) cold-drawing, where the bars are pulled through a die with no surface removal; and (2) turning and grinding, and grinding and polishing both of which remove the surface. Only the cold-drawing procedure is discussed here.

Cold-drawing is the process of pulling a pickled-and-limed bar through a die for the purpose of producing a bright, smooth surface finish, and close tolerances. The alloy bars are prepared for cold-drawing by pickling in a hot solution of dilute sulphuric acid for removal of scale. This is followed by a water rinse, and immersion in a hot lime-water bath to neutralize the effects of the acid, as well as to aid in carrying special liquid lubricants into the die.

Alloy bars may be cold-drawn in any of four conditions: *as-rolled*, *normalized*, *annealed* (lamellar or spheroidized), or *quenched and tempered*. These conditions are determined by the grade of alloy steel, the hardness, and the mechanical properties desired for a given end use.

In cold-drawing, the alloy bar is machine-pointed to reduce the size at one end so it will pass easily into the die opening. Otherwise, the bar is pushed or extruded into the die by an auxiliary device. A die-holder, which can be made to contain from one to four dies, is mounted in an appropriate head assembled across a "draw bench," so that from one to four bars can be drawn at the same time. The draw bench has a bed which accommodates a 4-wheel buggy with jaws that grip the pointed ends of the bars as they emerge from the dies. The buggy has a hook on one end which engages an endless chain, thereby pulling the bars entirely through the dies.

After cold-drawing, each bar feeds automatically into a straightening machine, and is sheared or "cracker-cut" to length on appropriate machines. Saws are used when the cross-sections of the bars are too large to be cracked or sheared, or when square ends are required.

Smaller sizes in the form of coils are drawn on "bull-blocks," or "wire-blocks," depending on sizes, followed by straightening and cutting on special machines.

Specifications for chemical composition, grain size, hardenability, and the like, of cold-drawn alloy steels have been given long study by Bethlehem metallurgists. If you would like suggestions on cold-drawn products, or any other problem concerning alloy steels, our metallurgists will be glad to give you all possible help, without cost or obligation on your part.

In addition to manufacturing the entire range of AISI alloy steels, Bethlehem produces special analysis steels and the full range of hot-rolled carbon grades.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

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IRON AGE

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Digest of the Week in Metalworking

News of the Industry

Congress Faces Trade Battle: Protectionists, free traders get set. 83
Steelmakers Compare Volume, Earnings: Hunt for some answers in '62. 88
Industry After Atomic Attack: What should be done now to be ready? 89
Trade Groups Sight Upturn: Executives feel 1962 upswing has begun. 90
Report on Yugoslavia: Industrial plans outrun financial growth. 96

Engineering-Production Developments

Computer Enters Hot-Strip Mill: Steps up quality and curbs waste. 113
Fiber-Glass Plastic Pays Off: Light mass teams up with good strength. 116
Profile Welder Builds Beams: Converts plate into structural shapes. 118
How to Install Metal Hose: Use simple rules to extend service life. 119
New Alloy Generates More Power: One square foot yields 10-kw output. 121
Aluminum Castings Vie for Auto Jobs: Process dictates final choice. 122
Storage System Saves Space: Truckers tote bins through inventory. 125
Nylon Pads Deburr Fine Parts: Powder-packed fabric laps metal parts. 126

Markets and Price Trends

Foundry Profits Fall Again: Closings soar; price squeeze tightens. 86
What Are Computer Limits? Management decision-making role debated. 95
Machine Tool Outlook Brightens: Order rate high despite Oct. drop. 103
Steel Summary: Strike-hedging order pace is ahead of 1959's. 165
Nonferrous: Silver prices hit new high after Administration action. 174

Editorial

We Learn the Hard Way, In Latin America, at Least 5

Metalworking Newsfront

Business Forecast 7
Metalworking Labor 9
Washington 11
International 13
Techfront 15
Market-Planning Digest 81
Report to Management 95
Spacefront 111
Steel Summary 165

Industry Trends

Automotive 99
West Coast 101
Machine Tools 103
Purchasing 166

Markets and Prices

Price Section 165
Steel Products 168
Ferrous Scrap 170
Nonferrous 174

Departments

Letters 21
Fatigue Cracks 23
Meetings and Exhibits 25
Industrial Briefs 92
Men in Metalworking 104
New Patents 130
Technical Literature 133
Design Digest 136
New Equipment 150
Clearing House 184

ADVERTISING INDEX 187

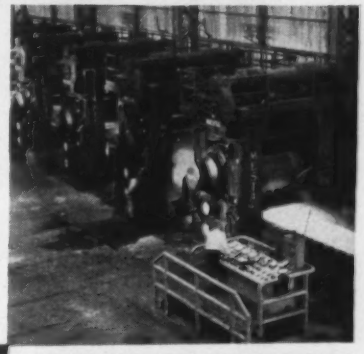
Special This Week

Congress Braces for Trade Battle

Congressional sparks should fly next month when the Administration officially introduces its new freer trade plan. Both sides already are sharpening their verbal attacks. The outcome is bound to leave its mark on American industry. And this week's Special Report previews the struggle that's ahead. p. 83

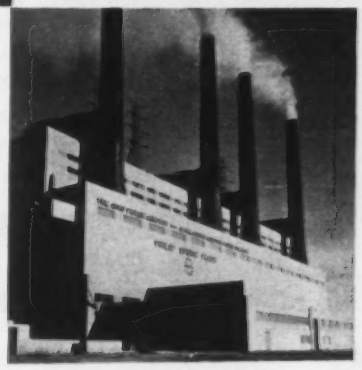
Foundry Profit Squeeze Tightens

Closings this year are rocking the foundry industry. They are at the highest level since 1958's record year. Foundry profits will barely clear 1 pct before taxes. Customers balk at premiums for quality. Business improvement is nowhere in sight. p. 86



Computer Curbs Waste in Hot Mill

Computers are moving into hot-strip mills. The first installation is just about ready to roll. It will upgrade operating practices, control coil thicknesses, automate mill setups, log production data and arrange all processing schedules. p. 113



Next Week

A Growing Market in Power

Many industries have not found the 1960's up to expectations. But this doesn't include electric power. The nation's power generators are upping procurement by $1 billion a year. Next week's Special Report outlines how this surge affects metalworking.

How do you begin to evaluate quality in steel tubing?

How do you begin to evaluate quality in steel tubing? The place to start is with the steel.

Before the tube you use actually begins to take shape, the physical and mechanical properties which determine tube quality have been built into the steel.

Certainly, there are quality factors of the tube such as dimensional uniformity, surface finish and heat treatment. But they can only be as good as the quality of the steel permits.

The point: the best alloy tube for your application is one that has been produced to your specifications from melt to finished tube. And, your best source is a manufacturer with integrated steel and tube making facilities. We invite you to investigate ours.

The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

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We Learn the Hard Way, In Latin America, at Least

A week or so ago, the Dominicans were all for us. We had supported the banishment of the cruel dictators. Then, presto! The same Latins were cursing us a week later.

This was confusing to some of us. But the usual explanation was put out by the "insiders." It was all due to Castro or to the Communists. Even our State Department officials were said to be "surprised" at the anti-American attitude in a nation we had helped to rid itself of anti-democratic rulers.

If it were not so serious, all this would be comical. But it is dead-serious. It shows that our people right on the scene do not understand what our status is in Latin American nations.

We are not liked by the p e o p l e of Latin America. No matter what the striped-pants fellows tell us, Uncle Sam can get the bronx cheer faster there than anyone else. There are a few reasons for this. And it ought to be required reading for Washington and for those naive souls who look upon the Latin masses as putty to be molded to our way of thinking.

Most of the Americans in Latin nations never talk with the "people." They are insulated from the masses, and almost insulated from the big-time Latins who know what goes on.

Many of the diplomatic corps' members are far away from what really goes on at the "people level." The American clubs and colonies are places where high-level chit-chat is the nub of discussions. Even if a middle-status foreign service fellow tried to alert our top people, they might not listen. They haven't in the past.

The fact is there are few, if any, Latin nations which have a middle class. People are either well-heeled or are as poor as church mice. That means the masses will listen to anyone who is against those who "have it." We have it, so it isn't strange that Latins secretly—and publicly—tear off our hides quite often.

Also, the rich moguls in South America are in no hurry to see democracy work. Many sincerely say it won't. And events often seem to back them up.

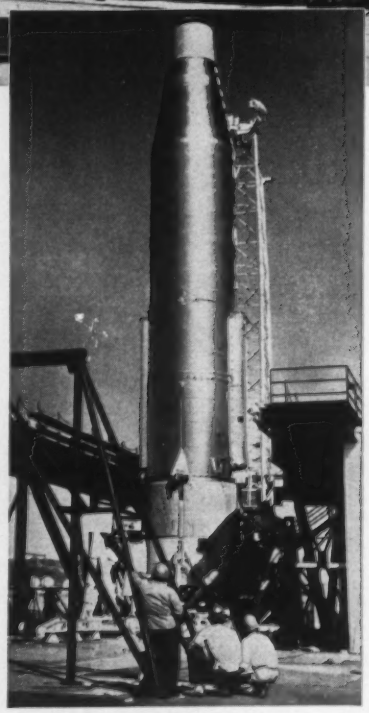
We are going to learn the hard way that we are cordially disliked South of the border. Whether we can change this is far from clear. So whatever we have to do, we better just do it and forget what "they" think about us.

Tom Campbell

Editor-in-Chief

CONVAIR ERECTOR-LAUNCHERS RELY ON POWERFUL PHILADELPHIA GEAR DRIVES

Atlas ICBM in stored position. Arrow points to heavy duty Philadelphia Gear hoist drive, which quickly erects missile to launch position for skyward voyage. Erector-launcher designed and built by Convair (Astronautics) Division of General Dynamics Corporation.



Atlas can now lie low till needed . . . new hoisting mechanism eliminates massive gantry towers

The Air Force has equipped itself with a new missile hoist mechanism which is both speedy and powerful. These two requirements plus ultra-reliability have qualified Philadelphia Gear Drives for the moments-notice job of erecting Atlas to launch position. The "Big Punch" is now stored horizontally. These erector-launchers are now operational at Atlas ICBM complexes at Warren Air Force Base, Wyoming.

The Philadelphia Gear Drive is a standard, all-steel, parallel shaft reducer. Output torque is 634,000 lb/inches at 7½ rpm, on low speed shaft; 1,250,000 lb/inches under emergency conditions; ratio—234:1. All units are load tested to 300% of normal rating.

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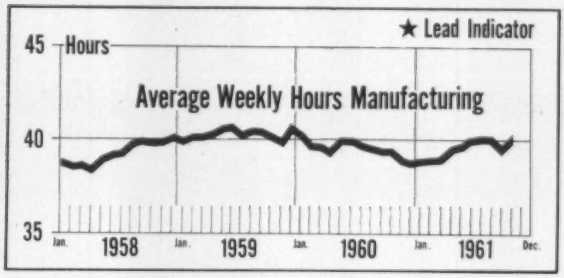
Factory Workweek Tops 40 Hours

The average factory workweek rose in October to 40.1 hours, up from 39.5 hours in September. This resumes the steady advance in the length of the workweek that started in January. Auto strikes did most



to cut down the factory workweek in September.

The longer workweek boosted workers' spendable earnings and buying power to all-time highs in October.

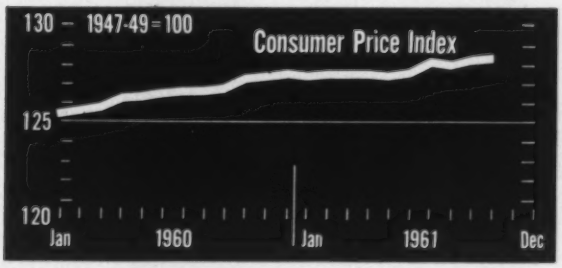
And most importantly, with the workweek now more than 40 hours, the promise is brighter that industry will be taking on more workers. Any cut in jobless rolls will be a real spur to further recovery.

Consumer Prices Hit New High

The consumer price index in October topped off at a new record high level of 128.4. But there is no sign of an inflationary "take-off." This is because the price advance is not a broad one. And it is moderate. In fact, the October-to-October price advance was the smallest since 1955.

And another fact that moderates the price picture is that consumer buying power in October hit an all-time high.

Personal income, savings and loan credit are all in "fat" positions and able to absorb fractional price



moves. Price-income relation is more meaningful in measuring inflation than year-to-year price relation.

Holiday Spending Is Eyed

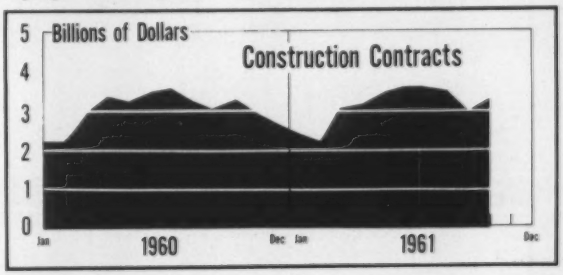
The consumer, with his fat bank book and reluctant buying attitude of late, is being watched carefully by businessmen and economists as he goes about his Christmas shopping. Many regard the holiday spending level as a good leading indicator of retail sales for the months to follow. Stores get almost 20 pct of their annual sales from Christmas buying.

Here are some forecasts of Christmas spending this year compared to last: Commerce Secretary Hodges, up 5 pct; National Retail Merchants Assn., up 2 pct; National Industrial Conference Board, up 5 pct; Chicago Printed String Co. (annual survey), up 4.4 pct.

Housing Pickup Spurs Building

Contracts for future construction in October at $3.3 billion were led by a strong pickup in residential building contracts. These contracts totaled $1.5 billion for the month, up 8 pct from a year ago.

The really bright picture in this showing was an 18 pct gain in single-family housing. This is encouraging. Housing has been one of the laggards in the



recovery. But it is still too soon to tell whether builder optimism or actual buyer demand is more strongly reflected in the October showing.

Non-residential building contracts for the month, at $1 billion, were off 14 pct from year-ago figures. And heavy engineering contracts, at $.8 billion, were up 3 pct.

Business Failure Rate Slackens

Business failures in October numbered 1446, up 12 pct from September. And they were 8 pct heavier than for October of last year.

But favorable signs rule in the casualty figures. The uptrend in failures has slackened from earlier months this year. At that time, month-to-month increases in failures averaged about 15 pct.

Also, dollar liabilities of failing companies in October fell to $70.3 million, the second lowest for any month this year.

Manufacturing casualties ran higher than in September mostly in the food and transportation equipment industries. And the toll in construction was up.

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NEW DIMENSIONS IN ELECTRONIC DEVICES

Auto Production Adds New Jobs

The new push of production of 1962 models has picked up employment for at least one automaker.

FORD'S DENISE: We hope they will be permanent.

Ford Motor Co. has hired 1350 new hourly production employees in the Detroit area since mid-October.

More than 40 pct of the new autoworkers got jobs at the giant Rouge plant at Dearborn, the home Ford plant. This is the first time in recent years that the Rouge has added new workers.

"For the past few years we have been able to draw upon our recall lists of laid-off employees," said M. L. Denise, vice president of labor relations. "This year we have exhausted the Detroit area lists."

Mr. Denise also holds out strong hopes of a stable labor force.

"We hope these new employees will become permanent employees of the company," he said.

Unions Ranks Close As Numbers Drop

There's an obvious reason behind a more conciliatory stance between labor leaders of different factions. It's the declining rate of union membership.

The number of union members has stayed fairly level since 1953. But union membership as a percent of the total labor force has declined. So labor leaders have relaxed their cut-throat tactics among themselves while joining in a total effort to expand their ranks.

In some cases, it's more of a hold-the-line tactic, rather than expansion.

Here are some figures that show the situation:

According to a Dept. of Labor study, total union membership in the U. S. has stayed level since 1953. At that time, union membership totaled 16.9 million. In 1960, the figure was 17.05 million. In the interval, union membership had reached a peak of 17.5 million.

A more accurate picture is shown in union membership as a percent of the total work force. In 1953 it reached 25.2 pct. Since then, it has dwindled few percentage points at a time to its present 23.3 pct.

This shows that while union membership has held relatively level, it has not kept up with the growth of the national labor force.

Some sidelights of the report: In 1960, an estimated 2.2 million white-collar people were union members. This is an increase of more than 8000 since 1958.

Labor Advisors Split

Dissension in the ranks may dull the effectiveness of President Kennedy's Labor-Management Advisory Committee. As voting time nears on a number of reports, word filters out of the Administration that labor and industry members of the 21-man committee are finding it hard to agree.

Their disagreement is the typical division on labor-management policies which plagues union-industry projects consistently. This type of dissension has killed past top-level labor-management groups. It also occurred under President Eisenhower and under President Truman.

The members are said to be squabbling over several of the policies to be set, particularly on collective bargaining. Handling of strikes is one report on which the committee is working.

Though it has not been made public, reports are that the new collective bargaining approach recommends changes in the Taft-Hartley law to give fact-finding boards power to make strike settlement recommendations. Also striking unions would be forced into 80-day cooling-off periods.

The strike-handling report will not be among the first to be given to the President. Labor Secretary Arthur Goldberg says the committee probably will approve its first report next month—a study on the problems of automation. Other reports, now in subcommittee rough draft, are studies of wage and price policies and the impact of international trade on domestic industry.

How soon any of these reports gets to the White House depends on how quick the labor-management squabbling ends.

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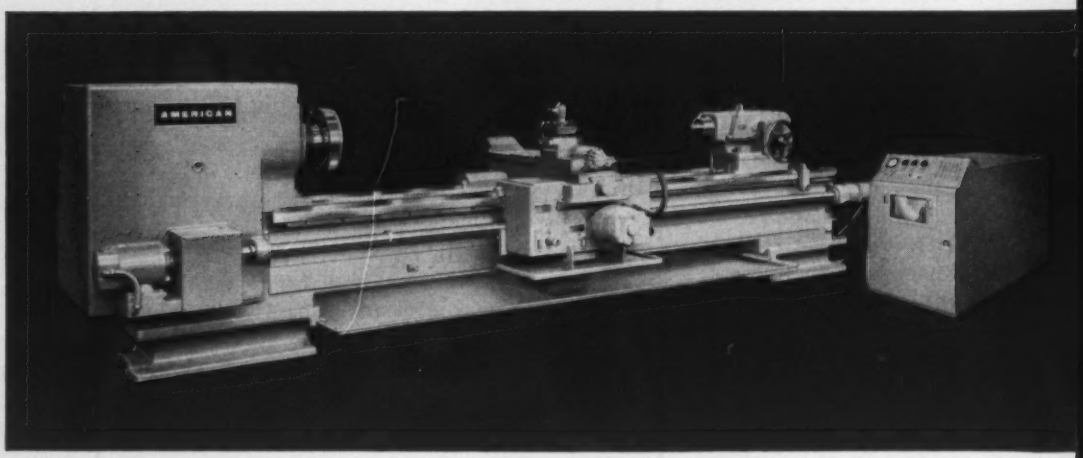

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★ Three-Way Fight Over Steel

The import and export position of the U. S. iron and steel industry has become a controversial subject in Congress.

Labor and management spokesmen appearing before a Congressional Committee offered vastly different proposals for curing industry's ills. And a steel union spokesman clashed with a steel district Congressman over cures.

It all evolved from testimony before a House labor subcommittee studying the effects of imports and exports on U. S. employment. The subcommittee is headed by Rep. John H. Dent, D., Pa., a strong protectionist (see cover story).

It was Rep. Dent who clashed with the labor spokesman, Meyer Bernstein, international affairs director of the steelworkers' union. Bernstein told the subcommittee, Congress ought to abolish tax advantages enjoyed by the steel industry's overseas subsidiaries. He also claimed that the industry was "misleading" the subcommittee through testimony on low wage foreign competition to support its arguments for higher tariff rates.

"Are you saying that low wage foreign competition is not a matter of paramount interest to Congress?" Rep. Dent asked Mr. Bernstein.

"I am saying that Congress has been victimized by employers . . . they have vastly exaggerated the wage differential," the USWA official replied. Rep. Dent said Mr. Bernstein's statement might represent the union's stand but steel workers in his district didn't share the feeling.

An industry spokesman, B. T. Dupont of the Glidden Co., appearing with William Batten of Vanadium-Alloys Steel, said parts of the industry would be stifled by low-wage foreign competition. He asked that Congress fix tariffs that would offset a price disadvantage to the industry.

Mr. Bernstein, appearing with union president David J. McDonald, told the subcommittee that a tariff increase might not work. He recommended tax law changes he said would remove advantages for overseas operations and encourage development of American iron ore sources.

■ Defense Production Geared to Infantry

The limited war concept given the big push in the last session of Congress continues to grow in the Kennedy Administration. The latest evidence is the Administration decision to add two Regular Army Divisions to U. S. Forces.

The limited war build up will be reflected in weaponry, too. And therefore, defense industries must continue to keep their production geared to the foot soldier.

The accent will be on conventional weapons, modernized to meet present needs. Mobility, through swift, armored vehicles and light trucks, will continue to be a big military budget item, as will water and air carriers designed to move men and equipment.

■ New Study Affects Metalworking Industry

The effects of procurement studies by the Defense Dept.'s Logistics Management Institute will be felt by the metalworking industries.

The Institute's first study project, to improve pricing of spare parts, will involve metalworking firms. Other projects, such as improving control engineering and design changes, getting more competition in defense buying; making more use of contract incentives; and evaluating contracting qualifications will also affect the industry.

The Institute is made up of business management specialists who will try to solve the Pentagon's buying problems.

S. R. Brainard, acting business manager of the new organization, says metalworking contractors will be asked to use new methods in selling defense systems to the Military. He also says industry could play a vital role in institute plans. "We welcome suggestion from such people as contracting agents for steel companies. If we get suggestions we'll use them," Mr. Brainard comments.

■ Interior Checking Lead, Zinc Problems

The U. S. Interior Dept. is digging further into the ills of the domestic lead and zinc industry. Assistant Secretary of Interior John M. Kelly winds up informal talks this week with mine operators on the problems of the industry.

The major subject of the talks was Federal subsidies which the Secretary of the Interior is now authorized to pay faltering producers of lead and zinc. Though Congress must yet appropriate funds for the payments, it authorized them this year.

Mr. Kelly's talks with producers might develop further assistance proposals.

The Assistant Secretary got together with industry men in the four major lead-zinc mining areas, Oklahoma, New Mexico, Colorado, and Washington state.

FOR NEW IDEAS IN

HEATING AND MELTING BY INDUCTION . . .

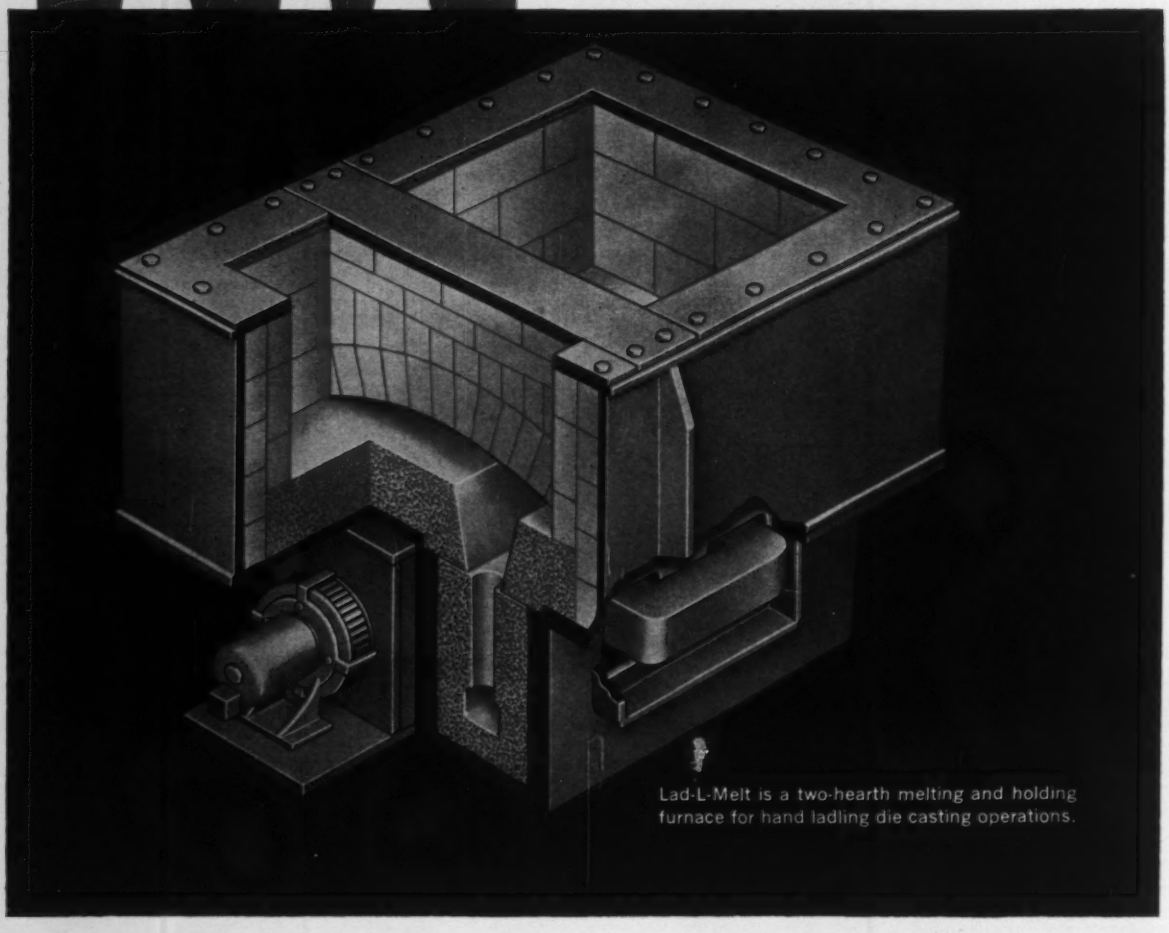
The complete line of furnaces for die casting includes: Single Hearth Holders; Single or Double Hearth Ajaxomatics for automatic pouring; Double Hearth Melters and Holders for hand ladling.

WATCH AMX

Induction Heating is our ONLY Business

Ajax Magnethermic CORPORATION

GENERAL OFFICES P.O. Box 839 • Youngstown 1, Ohio
TRENTON DIVISION 930 Lower Ferry Road • Trenton 5, New Jersey
YOUNGSTOWN DIVISION 3990 Simon Road • Youngstown 12, Ohio
AJAX MAGNETHERMIC, CANADA, LTD. Box 779 • Ajax, Ontario



Lad-L-Melt is a two-hearth melting and holding furnace for hand ladling die casting operations.

U. S. Companies Gain In World Marketing

U. S. companies continued to expand abroad in the first half of this year. Gains were most noticeable in the European Common Market and in Asia.

Booz, Allen & Hamilton, national management consultants, report this rising trend in a survey of new U. S. foreign business activities. The survey covers new establishments, new licensing agreements and expansion of existing facilities.

Involved are 690 U. S. companies. The survey examines 1195 activities that took place from July, 1960, to June, 1961.

Nearly 30 pct of the foreign business activities were made by companies that had sales volumes of $50 million or less. The consultants point out, however, that large U. S. companies continue to be a major factor in foreign markets: About one-half of all foreign activities were accounted for by 255 companies that are among the 500 largest U. S. companies.

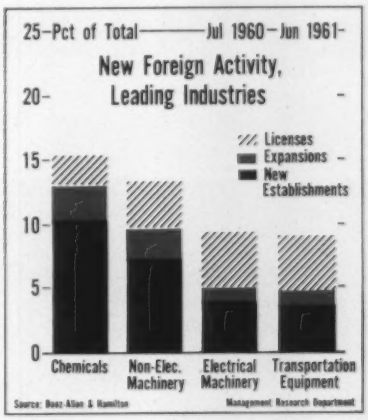
Chemical companies took nearly 15 pct of the new foreign activities. The next most active industries were non-electrical machinery, electrical machinery, and transportation equipment.

Up to 1960, direct foreign investment by industry totaled: mining and petroleum, 43 pct; chemicals, 6 pct; machinery, 4 pct; and electrical machinery, 3 pct.

Over half of the new foreign activities of U. S. companies were devoted to new operations. During the 12-month survey period, 453 U. S. companies set up 653 new foreign business units. Of these, 71 pct were manufacturing facilities.

Western Europe and the growing Common Market accounted for 49 pct of the new manufacturing operations. Latin America was the next favored area.

During the year, 143 U. S. companies expanded 219 foreign operations. Over 75 pct involved manufacturing growth, and Western Europe led here, too, with 54 pct of the total expansion. Great Britain took the biggest single share of U. S. manufacturing expansion, 21 pct of the world total.



Licensing was more active during the second half of the survey period. During the entire year, 218 U. S. companies completed 323 licensing agreements.

The consultants note that licensing is desirable when a company enters the foreign market for the first time, and where risks are great.

U. S. Companies Shown Trade Opportunities

Top Commerce Dept. officials have spelled out profit opportunities abroad for U. S. industries.

Commerce Secretary Luther Hodges, in a New York address, stressed the need to increase U. S. exports. He said opportunities exist and "they must be pursued."

William Ruder, Assistant Secretary of Commerce, outlined some of these opportunities to a meeting of the Far East-American Council of Commerce and Industry.

Japan offers limitless opportunity for the sale of "just about every type of product and service."

Thailand is in the midst of a six-year program and needs equipment.

Malaya and Singapore offer equal opportunities.

Large export markets await development in India and Pakistan. Many countries, in the throes of economic development, can absorb entire industrial plants as well as smaller manufactured units.

Steelmakers Cite Foreign "Threat"

Foreign competition as "a threat to the entire" U. S. steel industry was described at the Pittsburgh regional technical meeting of the American Iron & Steel Institute.

"For many years, America has maintained a foreign steel market and resisted foreign steel imports through superior productive ability, even with a significant difference in wage rates," noted D. R. Loughrey. He is consultant to the superintendent, openhearth dept., Pittsburgh Works, Jones & Laughlin Steel Corp.

"But this advantage can be lost," he warned. "Foreign imports have already made deep inroads into the domestic production of pipe, tubing, and wire products. And they will undoubtedly spread to include sheets, tinplate, and other products in the near future."

R. W. Simon, vice president-metallurgy, U. S. Steel Corp., called for greater excellence in American technical skill, managerial ability and administrative capacity.

"World steel competition has become more and more a contest between men," he said. "We have in European and in other world steelmakers some of the toughest, most resourceful competition we have ever faced."

NONDESTRUCTIVE INSPECTION DEVICES SEEK OUT MINUTE FLAWS

—help New Departure make better bearings!

One such device is *the N/D Ball Scanner.* As eagle-eyed instruments, they subject balls coming down the lines to the closest scrutiny. With unfailing consistency, they automatically reject balls having the minutest traces of rust, pits, grind marks, blemishes, and other faults, normally undetected by visual inspection. Result—balls made by New Departure are more defect-free than ever before. Bearings assembled with these balls and used in your products deliver better performance with greater reliability.

Development of nondestructive inspection devices has long been one of New Departure's principal R & D efforts. The Ball Scanner is just one of the existing devices that are already bringing you higher quality and more reliable bearings. Others are still under "wraps," but are destined to bring you even better bearings in the near future.

The advantages of these ball bearings are available to you now. Contact the New Departure Sales Engineer in your area. New Departure, Division of General Motors Corporation, Bristol, Connecticut.

NEW DEPARTURE

BALL BEARINGS · PROVED RELIABILITY YOU CAN BUILD AROUND

Impact at 30,000 Fps

Using electrical discharges to increase the propelling force, a new super-velocity gun will probably accelerate a projectile to 30,000 fps. Now well advanced in the planning stage, it promises to be the most powerful impact-testing facility in the U.S. With this sophisticated tool, scientists will be able to check material changes under impact levels previously unobtainable.

Quick Shape for Cylinders

Specially-rolled sheets of aluminum yield hollow metal structures which are fabricated in one piece. First, these three-ply sheets are placed between hot dies in a hydraulic press. As the core of each sheet melts, a hollow needle is inserted into the core area. Air, injected through this needle, shapes the outer laminates into cylinders within the forming dies.

Carbides Win Bearing Test

Carbides excell as bearing and journal materials for heavy-duty pumps. That's the word from a company which has conducted a three-year series of tests involving hundreds of different material combinations. Water-lubricated carbides outperformed all other tested combinations of metals, rubber or plastics. They even tested some of the latest cermets.

New Vistas for Fiber Metals

Fiber metallurgy specialists say that 1962 will see this relatively new material make major marketing gains. Current research aims at aerospace applications, but the '62 defense buildup is expected to push this material into widespread use at an accelerated rate. One research unit has already stepped up its program.

Gages Wire Diameter

How do you detect variations in the diameter of wire as it speeds out of a drawing machine? A newly-perfected ionization gage may be the key. It senses diameter changes instantly. It also spots many other flaws such as slivering, out-of-round, piping etc. In operation, a sensing head signals any diameter change to the readout instrument. This unit is pre-set to the desired tolerance. When tolerances are exceeded, the signal trips a relay that's connected to either an alarm or machine-shutoff circuit.

Friction-Free Bearings

Gas-lubricated bearings are the key design item in a new low-temperature refrigeration machine. Heart of the unit is a small helium-expansion turbine that spins at 180,000 rpm. This speed is far too fast for ordinary bearings. But with gas-lubricated bearings, the shaft never touches a metal surface. Since there's no mechanical friction, strength of materials is the only factor that limits the velocity of this setup.

Welds With No Vacuum?

Can electron-beam welding be performed outside a vacuum chamber? The Air Force is sponsoring a program to study the possibilities. If feasible, suitable equipment and techniques will be developed. A final phase will evaluate welds produced by the new equipment. Work is now underway at the Aeronautical Systems Div.'s Manufacturing Technology Laboratory. Alloyd Corp. was awarded the 18-month contract.

"Reluctant" New Plastics

New types of plastics may be in the offing as a result of basic research at the National Bureau of Standards. Plastics are polymers, formed by joining monomers together. But some monomers will not join, or polymerize. NBS is delving into the use of gamma radiation under high pressure. Object is to produce polymers from these "reluctant" non-joining monomers.

Yttrium Modular Iron

After three years of testing, yttrium has proved itself an effective nodularizer for cast iron, reports the Crane Co. It can be used either in the pure or alloyed form. Other key features in yttrium's favor include: No flash problem; low sensitivity to chill factors; short cycle response to heat treatment.

Apply your special requirements to basic R. D. Wood press designs

Here's the sensible, economical way to design your own press. Working with numerous *basic* models, R. D. Wood engineers apply *your* specifications and modifications to produce the press precisely suited to your needs. No starting from scratch. No needless delays in construction. No paying for more design than you need. You're sure of quality too. For every Wood press is constructed of selected materials by master craftsmen. Here is your assurance of precise operation and long, trouble-free performance. When you need a press, bring your specifications to Wood.

R. D. Wood Hydrostatic Tube Testing Machine for tubes of 4½" to 12" diameter nominal sizes and in maximum lengths of 35'-0" at hydrostatic test pressures from 700 to 1500 psi. Resistance head can be adjusted for testing shorter lengths. Unit is completely self-contained. The tube tester is fitted with all necessary fittings and accessories. One man operates it. Write today for catalog and engineering information.

R. D. WOOD COMPANY

FLORENCE, NEW JERSEY

792 Fiberglas bags clean the air from Bethlehem's two new electric arc furnaces

Q. HOW DOES BETHLEHEM STEEL HELP CLEAR THE AIR IN SEATTLE?

A. WITH FIBERGLAS FABRIC FILTERS... *they operate efficiently at temperatures up to and even above 500°F.— twice the limit of other fabrics.*

By installing Fiberglas* filter bags at its new Seattle plant, Bethlehem Steel Company achieved 99.9% cleansing of the air without the need for costly cooling towers. This was possible because smooth, silicone-treated Fiberglas filter fabrics operate at temperatures up to and even above 500° F.... twice the limit of other fabrics. At this high temperature, condensation and corrosion, which shorten bag life, do not occur. Cleaning the bags is readily done by reverse air flow or sonic vibration. Their thermal endurance, dimensional stability, and resistance to moisture and chemicals make Fiberglas fabric filters the most economical choice.

CLEANING AIR IS OUR BUSINESS. Write for free authoritative guidebook: "Fiberglas Fabric Filters for High Temperature Dust and Fume Control," based on our presentation at the 1961 APCA Annual Meeting. Owens-Corning Fiberglas Corporation, Industrial Textile Division, 717 Fifth Avenue, New York 22, N.Y.

Makes the glass yarns, not the fabrics

OWENS-CORNING FIBERGLAS

*T-M. (Reg. U.S. Pat. Off.) O-C.F. Corp.

NEW ADDITIONS

to the Allegheny Ludlum High Strength and High Temperature Steels

AL REFERENCE DATA

Compiled by
ALLEGHENY LUDLUM STEEL CORPORATION
Oliver Building • Pittsburgh 22, Pennsylvania

	Alloy Name	NOMINAL CHEMICAL COMPOSITION											
		C	Mn	Cr	Ni	Co	Mo	W	Ti	Al	B	Fe	Others
Fe-Base	19-9DL	.30	1.0	19	9	..	1.4	1.3	.3	...	...	66	.4 Cb
	19-9DX	.30	1.0	19	9	..	1.6	1.3	.6	...	...	66	.....
	AF-71	.30	18	12.5	...	..	3	...	...	...	.2	73	.2N, .9V
	A-286	.05	1.4	15	26	..	1.25	...	2.2	.2	.003	54	.3 V
	Discaloy	.05	.6	13	26	..	3	...	2	.2	...	54	.....
	G-192	.60	8.5	22	...	..	....	...	...	...	...	69	.35 N
	V-57	.06	.25	15	26	..	1.3	...	3	.2	.008	54	.2 V
Fe-Ni	D-979	.05	.6	15	45	..	4	4	3	1	.01	27	.....
	AL 901	.05	.25	13	43	..	6	...	2.9	.2	.015	35	.03 Zr
Ni-Base	Waspaloy	.05	.3	19	56	14	4	...	3.0	1.3	.005	1	.....
	M-252	.15	.5	19	55	10	10	...	2.5	1	.005	2	.....
	R41	.10	.3	19	53	11	10	...	3.2	1.6	.005	2	.....
Co-Cr-Fe-Ni	S-590	.43	1.2	20	20	20	4	4	...	...	...	29	4 Cb
	N-155	.15	1.5	21	20	20	3	2.5	...	...	...	32	1 Cb
Co-Base	S-816	.40	1.2	20	20	44	4	4	...	...	...	3	4 Cb
	V-36	.30	1	25	20	42	4	2	...	...	...	3	2 Cb
	L-605	.15	1.5	20	10	53	....	15	...	...	...	...	.....

A number of the names listed above are tradenames of companies other than Allegheny Ludlum Steel Corporation

AL REFERENCE DATA

Compiled by
ALLEGHENY LUDLUM STEEL CORPORATION
Oliver Building • Pittsburgh 22, Pennsylvania

	Alloy Name	Density lb/in.³	100-Hr. Rupture Strength at				Short Time Properties					
			1200F	1350F	1500F	1600F	Room Temperature			1200 F		
				(X 1000 Psi)			TS	.2YS (X 1000 Psi)	Elong. %	TS	.2YS (X 1000 Psi)	Elong. %
Fe-Base	19-9DL	.287	52	28	17	...	118	69	55	75	37	33
	19-9DX	.287	52	28	17	...	118	69	55	75	37	33
	AF-71	.280	69	40	22	...	150	110	30	90	77	43
	A-286	.286	63	35	15	...	152	110	25	115	87	25
	Discaloy	.288	55	32	15	...	147	92	20	100	77	18
	G-192	.278	42	27	15	...	148	85	55	92	37	15
	V-57	.286	75	40	15	...	172	119	24	129	108	22
Fe-Ni	D-979	.296	94	63	35	21	200	143	18	157	123	17
	AL 901	.294	90	60	20	...	175	125	15	145	110	20
Ni-Base	Waspaloy	.294	98	65	39	24	185	130	28	160	120	22
	M-252	.298	95	62	35	20	180	122	16	155	110	17
	R 41	.296	100	67	44	28	200	150	15	160	130	10
Co-Cr Fe-Ni	S-590	.301	50	32	22	13	140	75	20	97	70	25
	N-155	.297	50	31	18	12	119	58	40	80	43	55
Co-Base	S-816	.313	60	38	25	16	140	72	35	115	55	27
	V-36	.303	64	35	25	18	145	67	55	95	40	28
	L-605	.330	70	43	24	15	150	70	50	98	48	28

Properties listed above are typical, and should not be used as specification minima.

Mar-Aging Steels...with yields over 250,000 psi PLUS toughness!

Looking for "special" properties even in the special steels? Take a look at the Mar-Aging Steels, a brand new group of high alloy, precipitation-hardening steels offering unmatched toughness and the strength of the best contemporary steels. Here are a few interesting properties ... yield strengths exceeding 250,000 psi ... notched tensile strengths over 400,000 psi . . . and the ability to maintain ductile properties below −80 F.

NOMINAL COMPOSITION OF MAR-AGING STEELS

	C	Ni	Co	Mo	Ti	Al	Cb
AL 25 Ni (250)	.01	25	..	..	1.4	.2	.5
AL 20 Ni (250)	.01	20	..	..	1.4	.2	.5
AL 18 Ni Co Mo (250)	.01	18	7	5	.4	.1	..
AL 18 Ni Co Mo (300)	.01	18	9	5	.6	.1	..

Discovered by International Nickel Company, developed and being produced by Allegheny Ludlum, the Mar-Aging steels achieve their high strength by means of an extremely simple heat treatment. Remarkably resistant to crack propagation, the Mar-Aging Steels are easily machinable, easy to weld, and possess unusually low work-hardening characteristics. Available in all product forms, the Mar-Aging Steels may be air melted, or vacuum melted for maximum notch toughness and transverse ductility.

TYPICAL MECHANICAL PROPERTIES OF MAR-AGING STEELS

PRODUCTS	.2 YS (X 1000 psi)	UTS (X 1000 psi)	Elong. %	RA %	Notch TS / Smooth TS
BARS (Heat treated)					
AL 25 Ni (250)	250	265	12	50	1.1
AL 20 Ni (250)	250	265	12	55	1.3
AL 18 Ni Co Mo (250)	250	265	10	50	1.5
AL 18 Ni Co Mo (300)	300	305	12	55	1.4
SHEETS (Cold rolled and aged)					
AL 25 Ni (250)	250	270	5	..	.7
AL 20 Ni (250)	260	270	4	..	.7
AL 18 Ni Co Mo (250)	285	290	4	..	.9
AL 18 Ni Co Mo (300)	300	310	3	..	.8

Together with A-L's family of famous stainless steels (all grades—all mill forms), low alloy-high strength steels, tool steels, bearing steels, and high temperature steels and alloys, the Mar-Aging Steels make the Allegheny Ludlum product line one of the most comprehensive offered to the aircraft and missile industries. And to assist in applying this family of steels, A-L offers customer contact service at any level in your organization, including in-plant teamwork with your specialists on your problems. Add the support of the A-L research organization, and technical literature written in *your* language, and you have the famous Allegheny Ludlum service.

3803

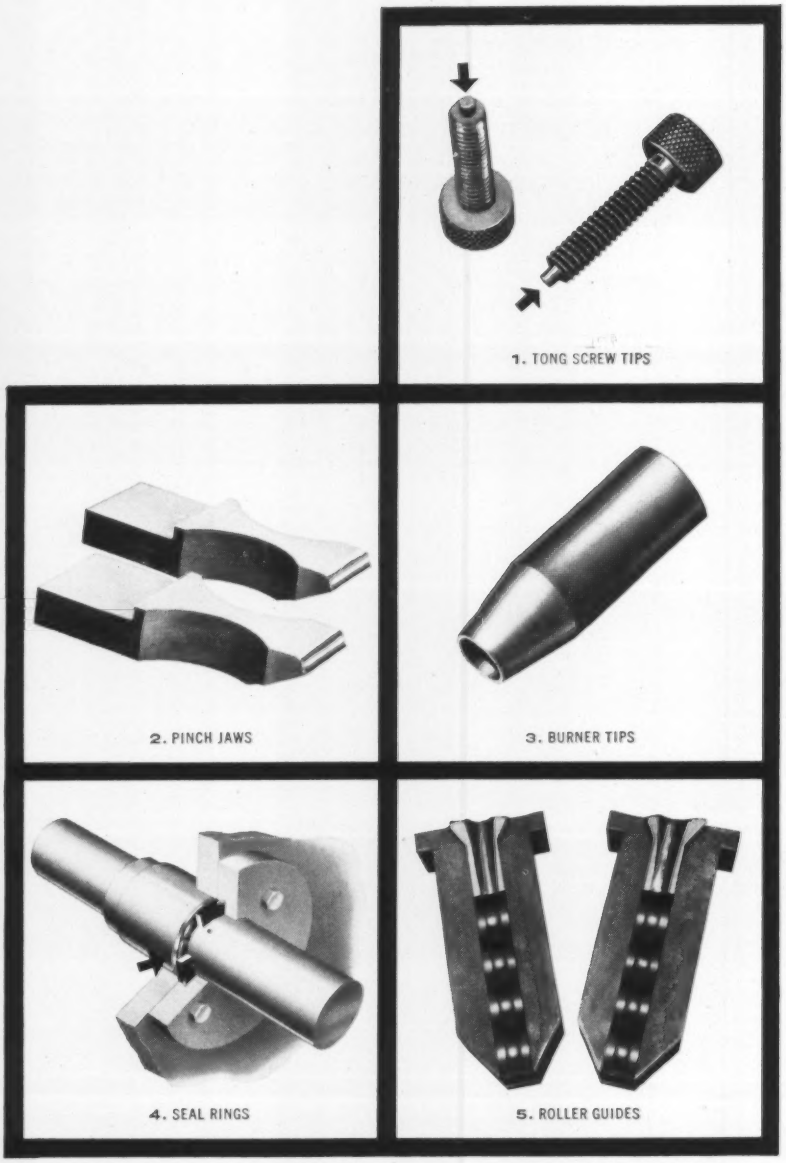
ALLEGHENY LUDLUM

NEW A-L LITERATURE

A new series of technical booklets on A-L High Temperature Alloys is yours for the asking. Each is packed with data to assist design engineers and procurement specialists in selecting materials for any high strength-high temperature application.

And be sure to get your request in early for the new Data Sheet on Mar-Aging Steels. Contact your local A-L Representative, today. Or write: Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address: Dept. MID 6.

let's evaluate our carbides in terms of your needs



You may find it profitable to discuss your needs for unusual engineering materials with a specially trained Kennametal Carbide Engineer. He *devotes his time exclusively* to applying Kennametal* hard carbides in metalworking tools and for construction of machine parts that normally wear out quickly.

Kentanium,* for instance, is a titanium carbide for use where resistance to heat is a prime requisite. This series of heat-resistant carbides can operate continuously at temperatures up to 2200°F—and at higher temperatures under specific conditions. Other unique properties include high strength, high resistance to thermal shock, abrasion, deformation, and highest stiffness-to-weight ratio of any known material.

Some typical examples of how Kentanium is being used in general industrial applications are:

1 Kentanium tips on tong screws, used to grip glass sheets as they pass through annealing furnace, are subjected to temperatures of 900°F to 1200°F—have average service life of 36 hours, or 150 to 1 ratio over steel screws.

2 Pinch jaws made of Kentanium solve a glass tubing pinch-off and vacuum sealing problem in the production of sealed beam lamps. Operating in a 1700°F flame that heats the withdrawal tube, they average 215,000 tubes as compared to 25,000 for steel jaws previously used.

3 Kentanium flame hardening burner tips, located inside burner head, showed no appreciable wear after 16 months' service. Copper tips averaged 3 to 4 months.

4 Seal ring of Kentanium, used in sealing a jet engine shaft, operated without lubrication at 15,000 sfm and at 1100°F—outperformed every other material tried.

5 Kentanium roller entrance guides rotate at speeds up to 4500 rpm, as hot wire rod is fed into finishing stand. Compared with hardened steel roller guides, Kentanium guides have increased service life 20 to 1; reduced maintenance cost up to 82%; and improved quality.

The outstanding properties of Kentanium, plus our creative research and development activities, are helping translate ideas into vital components used in all types of equipment to provide greater reliability and longer life.

For more information, call your Kennametal Representative or write for Booklet 666, "Proven Uses of Kennametal and Kentanium," which describes over 80 applications in many different industries. KENNAMETAL INC., Dept. IA, Latrobe, Pennsylvania.

*Trademark

38919

INDUSTRY AND KENNAMETAL ...Partners in Progress

Art of Listening

Sir—I can't let your ever-so-true editorial go by without a word of comment. I refer to your "Lost Art of Listening: Let Us Bring It Back Again" in the Nov. 9th issue.

I'm not prone to overlook editorials but yours stopped me short. It was so very, very, and sadly true. Won't you please write a sequel? . . . It might be good for these people who habitually interrupt the conversation with "Excuse me, please, but may I say something before I forget it?" . . . and the entire original subject may never be resumed. Maybe this is one reason for a dearth of listeners.

I recall a remark by one of my college professors. He told the class, "You should always give the other fellow credit for a certain amount of common sense even though you think it is of a low nature." How true—and how often are listeners given the impression they are morons? . . . —Raymond A. Holme, Ray Holme Advertising Service, Pompano Beach, Fla.

Sir—It was high time that somebody devoted a few cleanly scalpeled words to the "Lost Art of Listening"—and you did, convincingly.

Talk, talk, talk—and I believe that some of these gabby guys do it to impress others with their exaggerated importance.

Anyway, I have a feeling that a good many of your readers were "listening" to you.—W. E. McFee, supervisor, Product Information Service, Armco Steel Corp., Middletown, O.

No Pussyfooting

Sir—I've never had the pleasure of meeting you, which doesn't deter me from writing to congratulate you on the tremendously fine editorial (Portrait of Khrushchev: Cunning, Dangerous and Brutal) in the Nov. 16th issue of The Iron Age.

It was incisive, clear, and there is no pussyfooting. I believe it's about time a few of our newspapermen and our State Department officials began to take a similar view—in the open.—J. D. Myers, associate editor, Scrap Age Magazine, Springfield, Ill.

Sir—I just want to take a moment to compliment you on your very fine editorial in the Nov. 16th issue of your magazine. It certainly is to the point and pulls no punches on a situation that is certainly with us and one that we must face up to.

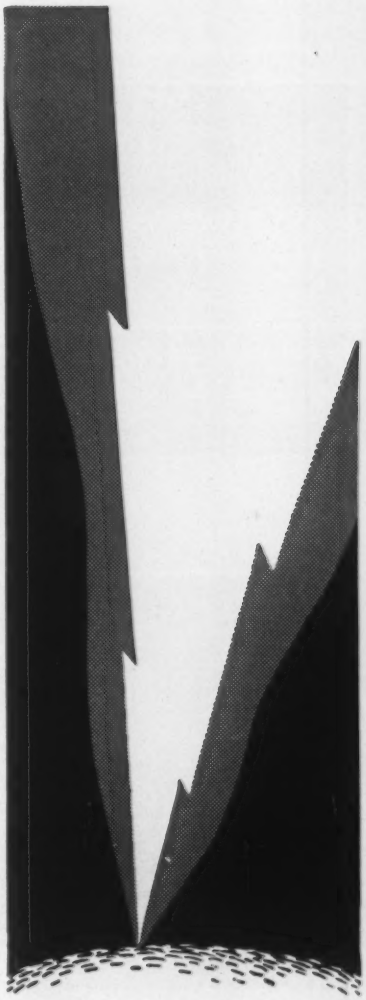
Our company has recently brought out a complete shelter ventilation kit which we market through our regular dealer organization. . . . I would like your permission to reprint your editorial and enclose it with our next sales bulletin.—Daniel A. Preston, president, P&S Machine Co., Inc., McMinnville, Tenn.

Labor Follies

Sir—This is not a disagreement, just a comment on a point I think should be kept well in mind. In your editorial of Nov. 23, "The Prologue Is Out for the Steel Labor Follies," you mention nationalization.

Isn't it reasonable to suppose that within, or allied with, our Democratic party there are patient, plodding, long-range planners (just as there are in every country) who are deliberately creating first one situation and then another which will eventually lead to the necessity of nationalization of everything and everyone?

What are we to do about it? I don't know . . . but on old New England farms they always figured that you either had to kill a brush fire while it was small or just pack up and beat it out of there.—Edward W. Robotham, The Edward W. Robotham Co., Hartford, Conn.



Southern Screws are USA-made with USA-made materials, by fastener specialists who know that burr-free heads and sharp threads mean faster, more profitable assembly.

If you have a fastening assignment on which you would like to save time, money and labor, contact your Southern Screw distributor for fast service. Or write direct to: Southern Screw Company, Box 1360, Statesville, N. C.

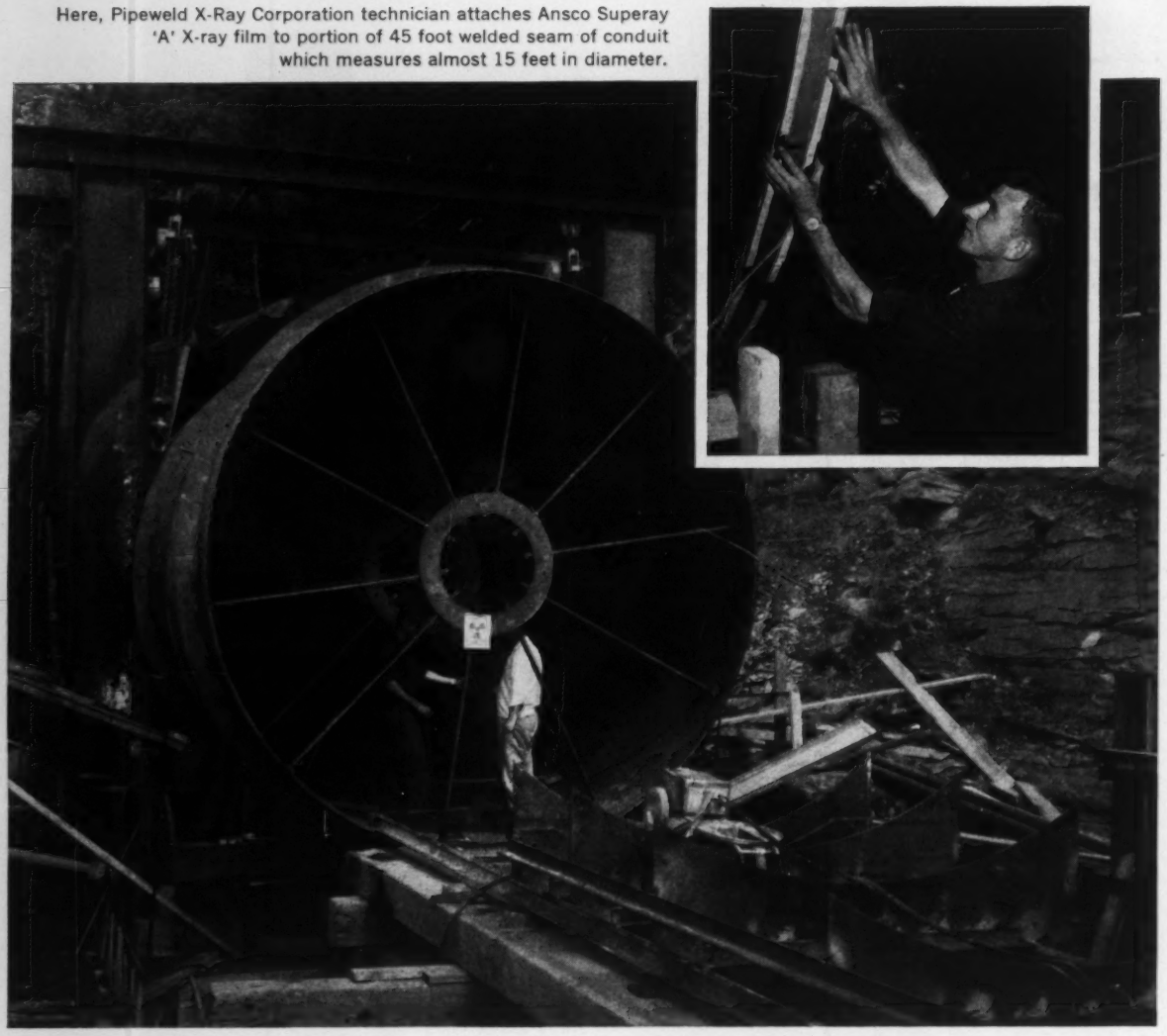
Types 1, 23, 25, F, & BF Thread Cutting Screws • Types A, B, C, & BP Tapping Screws • Machine Screws & Nuts • Stove Bolts • Drive Screws • Continuous Threaded Studs • Carriage Bolts • Hanger Bolts • Wood Screws

Manufacturing and Main Stock
In Statesville, North Carolina

Warehouses: New York • Chicago • Dallas • Los Angeles

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA

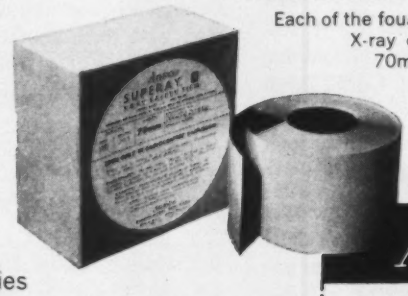
Here, Pipeweld X-Ray Corporation technician attaches Ansco Superay 'A' X-ray film to portion of 45 foot welded seam of conduit which measures almost 15 feet in diameter.



Pipeweld X-Ray Corp. uses Ansco X-ray Film to inspect seams of Giant Conduit for New York City Water System!

"Ansco Superay® 'A' X-ray film is the perfect answer for trouble-free radiography of welded seams in the field!" says Mr. Charles Earle, Jr., Manager of Pipeweld X-Ray Corporation of Perrysburg, Ohio. "We have found through experience that Ansco Superay films provide the uniformity and definition we require for quick, positive flaw detection."

There's a Superay X-ray film for every application. Your local X-ray equipment dealer carries a complete stock of Ansco Industrial X-ray Films and Chemicals . . . call him today about using these products in your operation.



ANSCO 70mm INDUSTRIAL X-RAY FILM

Each of the four different Ansco Superay X-ray emulsions is available in 70mm rolls from 100 feet up to 800 feet. Ansco, A Division of General Aniline & Film Corporation, Binghamton, N. Y.

Ansco
X-ray

Man in the News

We recently mentioned our good fortune (and their's) of having people on our cover who are on their way up. Frequently men whose pictures are on our cover are selected for positions of even greater responsibility.

We outdid ourselves this week, however. The man on the cover was promoted between the time we took his picture and our publication date. Also, he's very much in the news.

Key Appointment — The man we're talking about is George W. Ball. Last week he was promoted to Under Secretary of State from his previous position as Under Secretary of State for Economic Affairs.

This move was all the more newsworthy in that he replaced a controversial predecessor in Chester Bowles.

But what's our particular interest in Mr. Ball?

As everyone knows, one of the big issues coming up in Congress next year is that Congress must determine the trade policy of the U. S. as the Reciprocal Trade Act expires.

UNDER SECRETARY BALL: The Administration's spokesman.

Great Debate—It boils down to a major controversy between the free traders on one hand and the protectionists on the other. Of course, there are differences in degree, but that's the essential conflict.

President Kennedy has indicated he wants the trade barriers reduced. And one of his principal spokesman has been Under Secretary Ball.

In this week's Special Report, Washington editor Ralph Crosby analyzes the elements of this conflict, the issues, and possible outcome of what promises to be one of the great debates of the decade.

With Mr. Ball advancing the Administration's program, he was one of the key men interviewed in the story. Of course, there were many others on both sides of the issue, but no one can argue the point that he will be one of the leading figures.

So for those of you who have an interest or a stake in the U. S. trade policy (and what business man doesn't?) we suggest you turn to p. 83 for our report on the outlook for the U. S. foreign trade program.

In the Middle

Also on the required reading list this week is Cleveland editor Tom Rahan's report on the foundry price squeeze.

We think this is an important story that has implications that carry beyond one industry. In this case, we are discussing the foundrymen only, but we note the pattern appearing in other industries.

There are two sides to the problem of an industry caught in a squeeze that apparently is industry-wide. There always is.

In any case, we recommend Tom Rohan's story of an industry caught in a price squeeze.

Gusher

Coolant Pumps are

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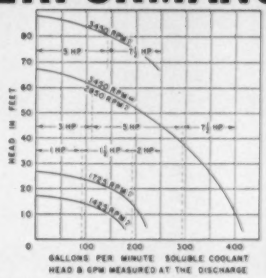

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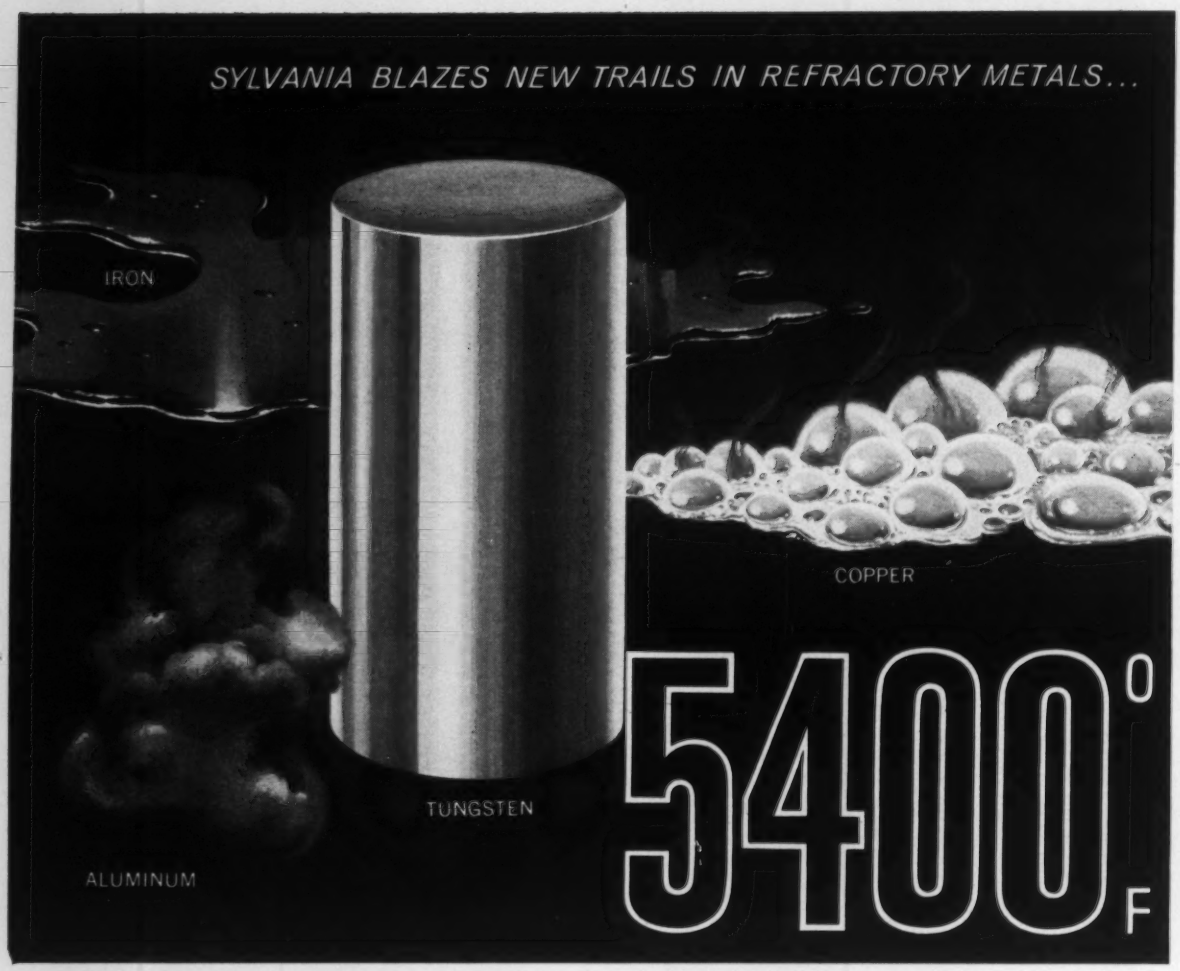

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COMING EXHIBITS

Materials Research Conference—Rensselaer Polytechnic Institute, Dec. 18-19.

Plant Engineering & Maintenance Show — Jan. 22-25, Convention Hall, Philadelphia.

Electrical Engineering Show—Jan. 29-Feb. 2, New York Coliseum.

MEETINGS

JANUARY

Reliability and Quality Control — Eighth national meeting, Jan. 9-11, Statler Hilton Hotel, Washington, D. C.

National Barrel & Drum Assn.—Annual meeting, Jan. 11-13, Americana Hotel, Miami Beach, Fla. Assn. headquarters, 1343 L St., N. W., Washington, D. C.

Institute of Scrap Iron & Steel—Annual convention, Jan. 14-17, Statler-Hilton Hotel, Washington. Institute headquarters, 1729 H St., N. W., Washington.

Assn. of Consulting Management Engineers, Inc.—Annual business meeting, Jan. 15, University Club, New York. Assn. headquarters, 347 Madison Ave., New York.

Mining Symposium—University of Minnesota and Minnesota Section, AIME, joint meeting, Jan. 15-17, Duluth Hotel, Duluth, Minn.

Compressed Gas Assn.—Annual meeting, Jan. 15-17 Waldorf-Astoria Hotel, New York. Assn. headquarters, 500 Fifth Ave., New York.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 15-19, Mountain Shadows Hotel, Scottsdale, Ariz. Assn. headquarters, 105 W. Madison St., Chicago.

Industrial Heating Equipment Assn., Inc.—Winter meeting, Jan. 22-23, The Drake Hotel, Chicago. Assn. headquarters, 2000 K St., N. W., Washington, D. C.

(Continued on P. 28)

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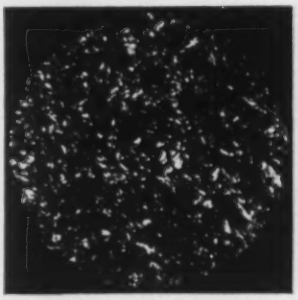

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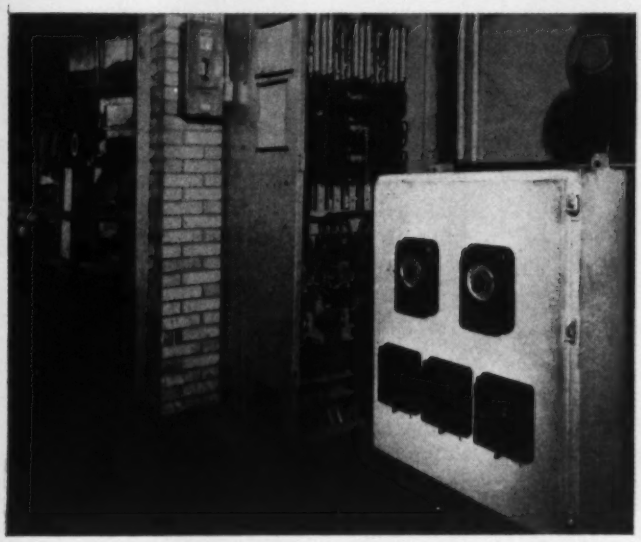

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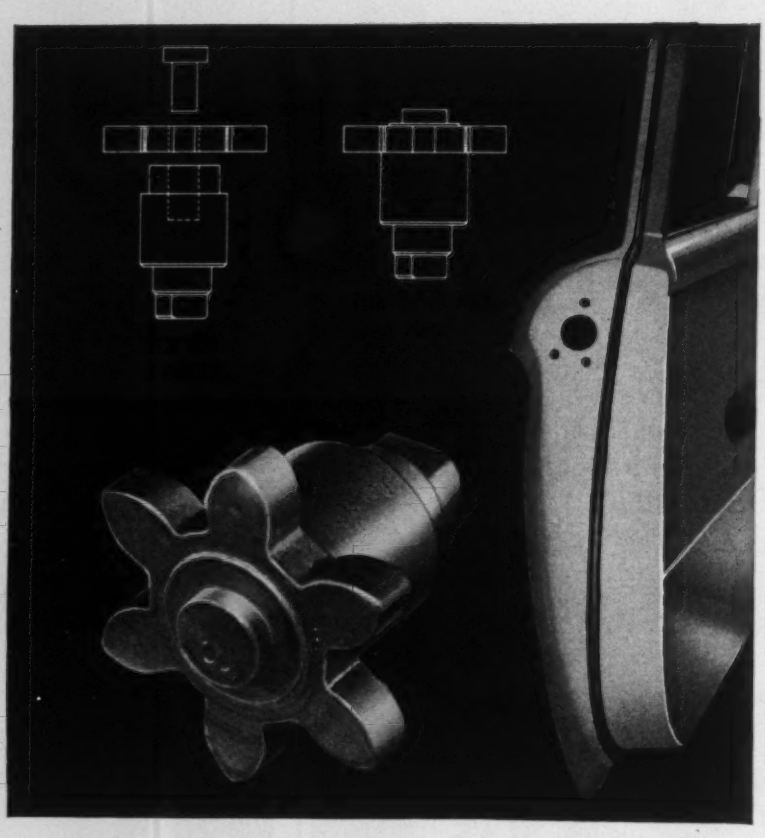

Auto maker saved $22 per thousand with Townsend Ultra-Special part

This Ultra-Special part is made by the Townsend Ultra-Special cold-forming process for $22 less per thousand pieces than the former three-piece assembly made by another method.

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MEETINGS

(Continued from P. 25)

Aluminum Assn.—Annual meeting, Jan. 24-26, New York. Assn. headquarters, 420 Lexington Ave., New York.

American Sprocket Chain Manufacturers Assn.—Annual meeting, Jan. 25-26, Drake Hotel, Chicago. Assn. headquarters, 819 South Aldine Ave., Park Ridge, Ill.

Truck Trailer Manufacturers Assn.—21st Annual convention, Jan 28-31, Palm Springs Riviera Hotel, Palm Springs, Calif. Assn. headquarters, 710 Albee Bldg., Washington.

Associated Equipment Distributors—43rd annual meeting, Jan. 28-Feb. 1, Hilton Hotel, Chicago.

Society of Plastics Engineers, Inc.—Annual technical conference, Jan. 30-Feb. 2, Penn-Sheraton Hotel, Pittsburgh. Institute headquarters, 65 Prospect St., Stamford, Conn.

Midwest Welding Conference—8th annual, Jan. 31-Feb. 1, Technology Center, Illinois Institute of Technology, Chicago, Ill. Institute headquarters, 35 West 33rd St., Technology Center, Chicago.

FEBRUARY

American Society for Testing Materials—Committee week, Feb. 5-9, Statler-Hilton Hotel, Dallas, Tex. Society headquarters, 1916 Race St., Philadelphia.

Materials Handling Institute, Inc.—Spring meeting, Feb. 6-7, Hilton Inn, Atlanta, Ga. Institute headquarters, One Gateway Center, Pittsburgh.

Industrial Truck Assn.—Spring meeting, Feb. 8, Hilton Inn, Atlanta. Assn. headquarters, One Gateway Center, Pittsburgh.

American Coke & Coal Chemical Institute—Eastern regional meeting, Feb. 8, Drake Hotel, Chicago. Institute headquarters, 711 Fourteenth St., N. W., Washington, D. C.

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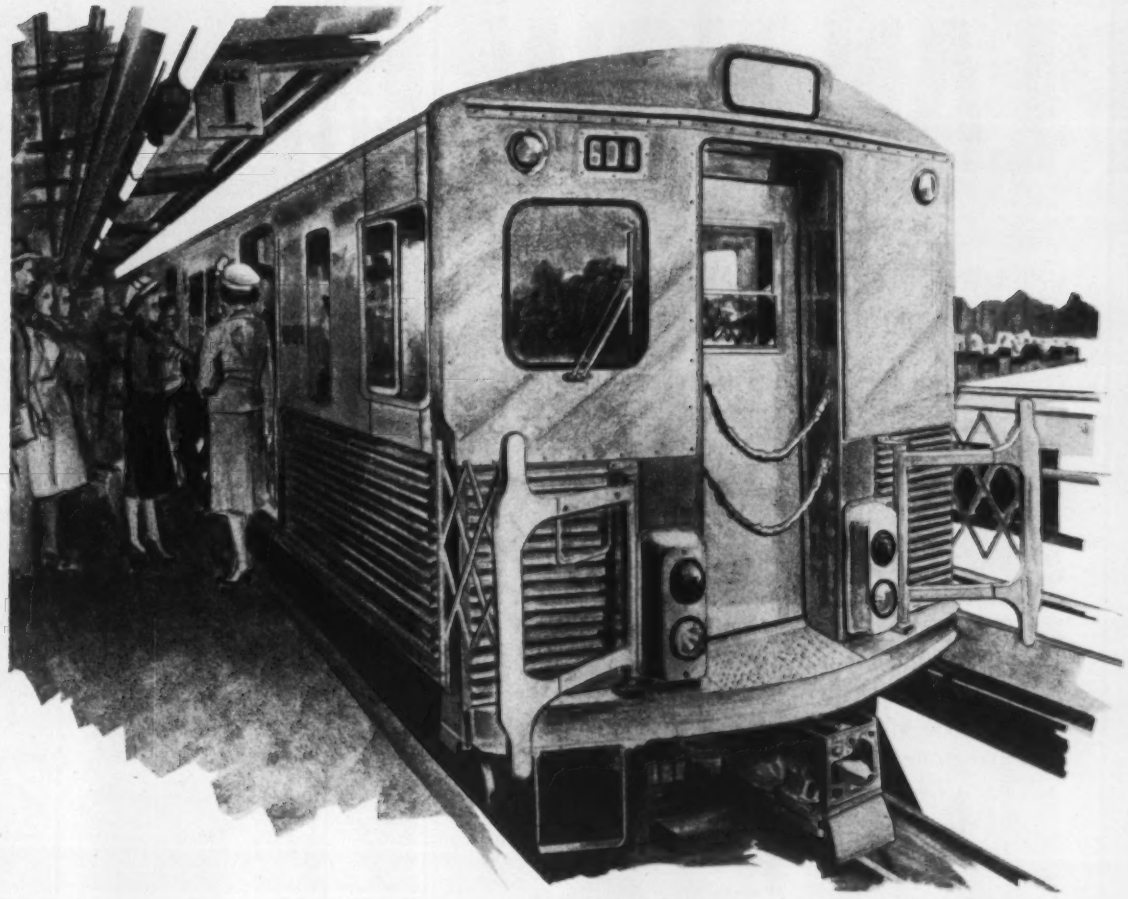

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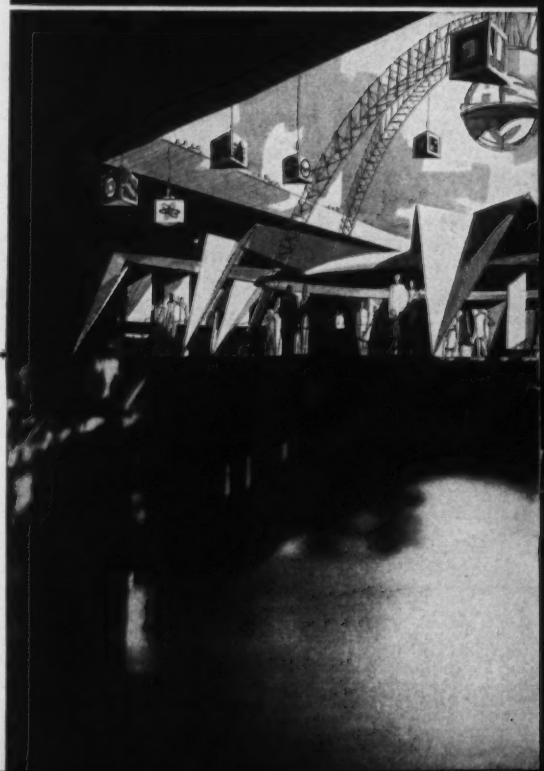

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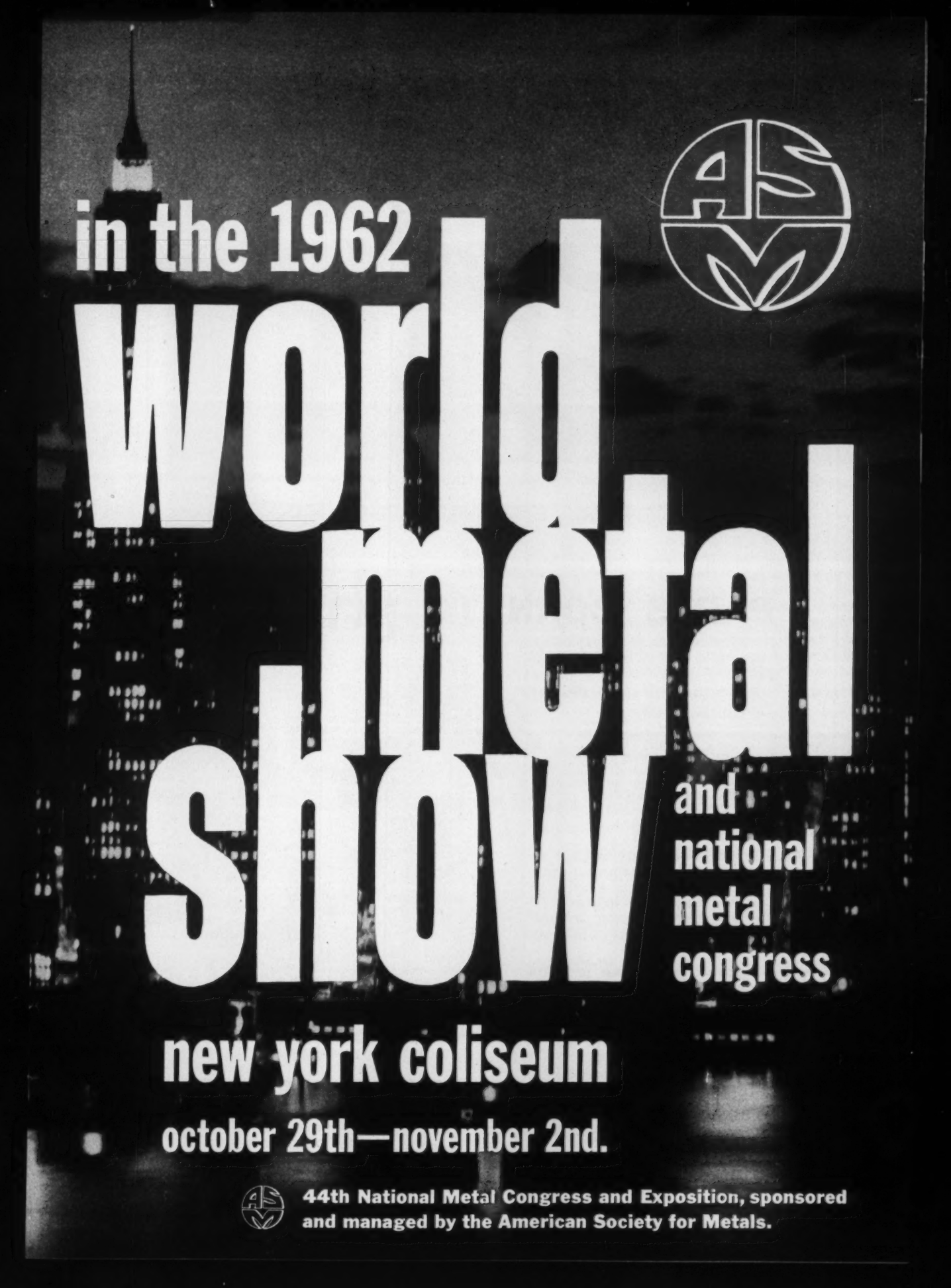
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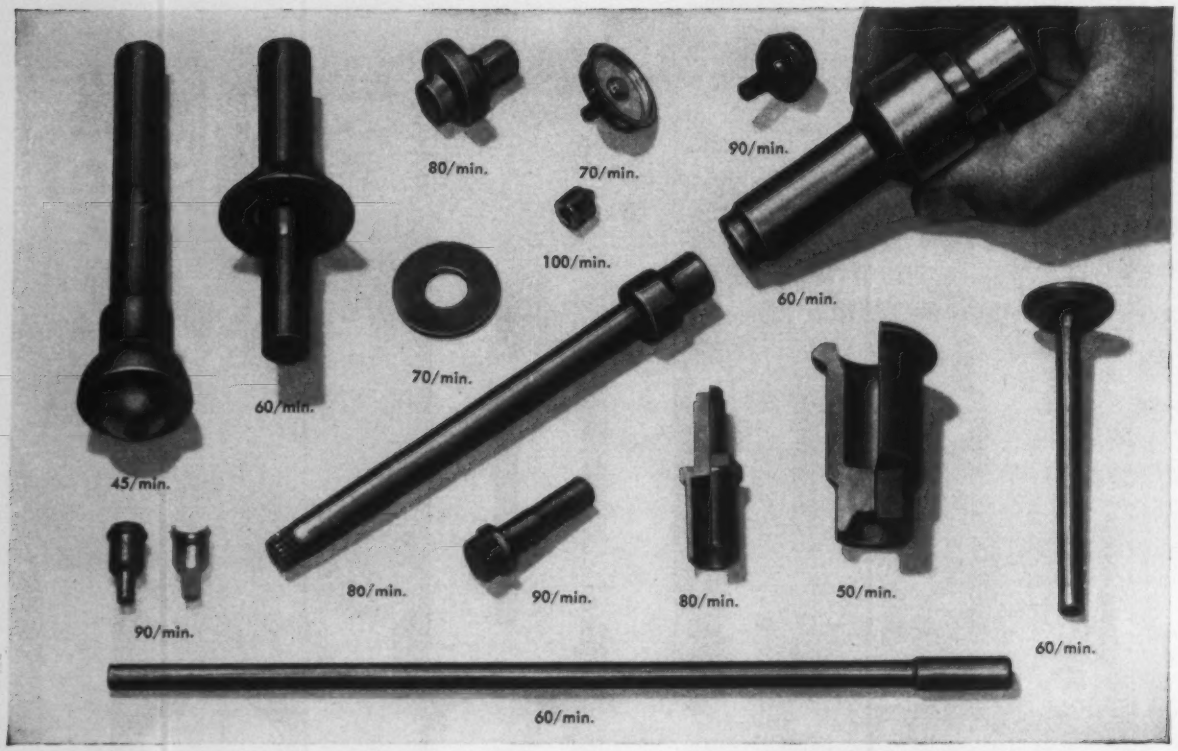

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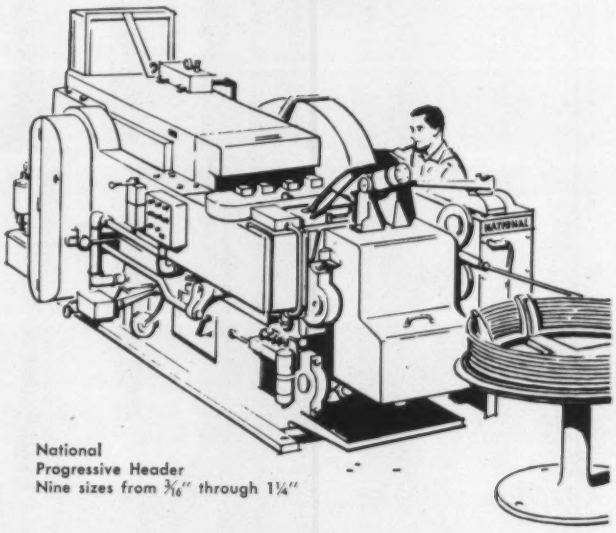

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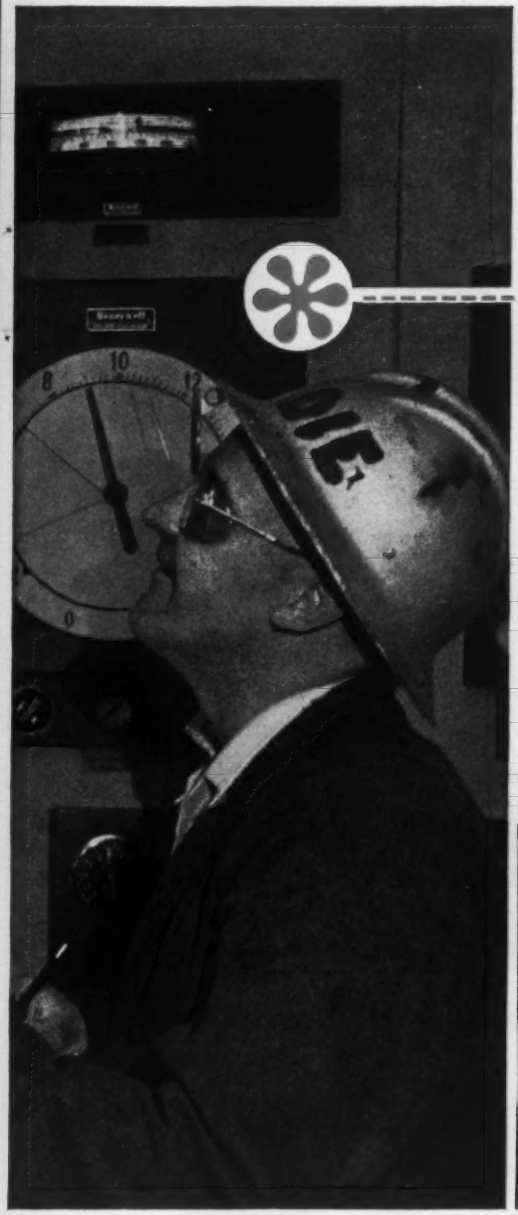
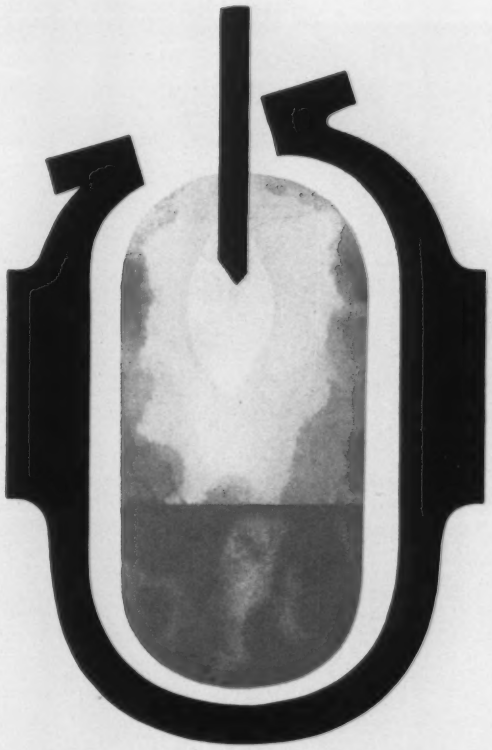
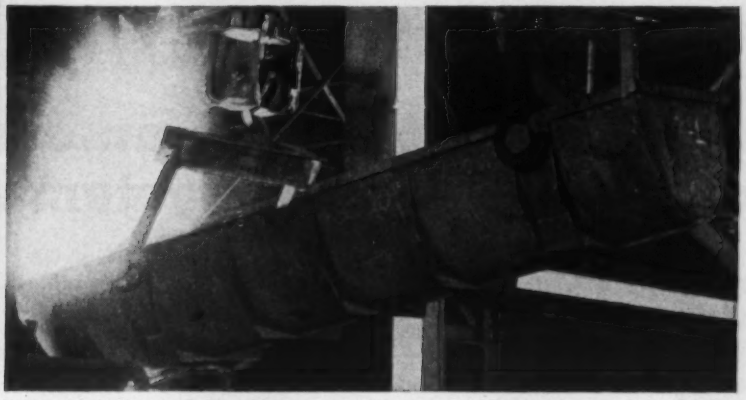
The flexibility and economy of the mill's oxygen process stem largely from a carefully-engineered control system. Honeywell instrumentation accurately meters high-purity oxygen, maintains efficiency of the converter blow, protects equipment from excessive temperatures and guards safety of operating personnel.







Using a basic charge of about 80 percent molten iron and 20 percent scrap, Acme Steel's oxygen converters produce high-grade steel at low cost. About 2,000 cubic feet of high-purity oxygen is required for each ton of steel.

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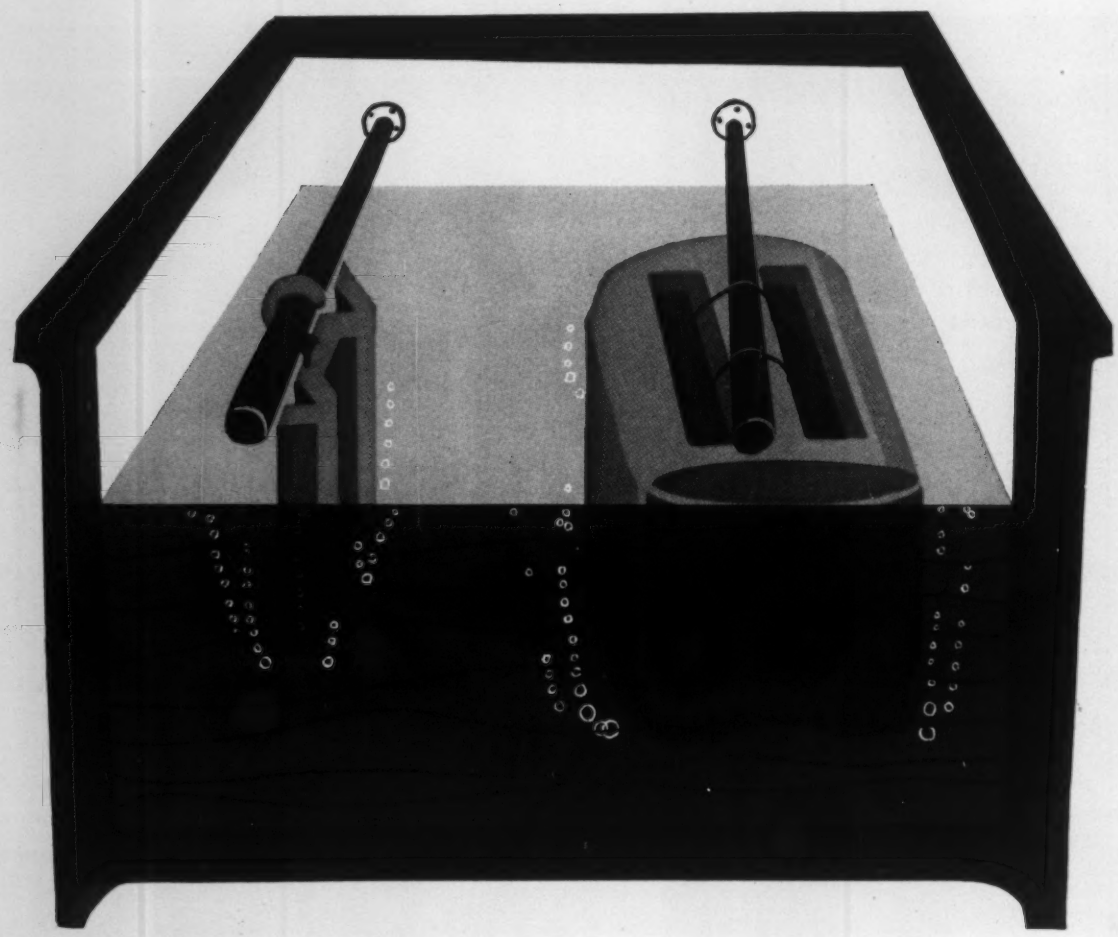
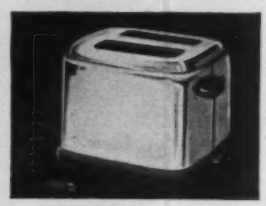


Cut plating preparation costs with the Pennsalt System Approach



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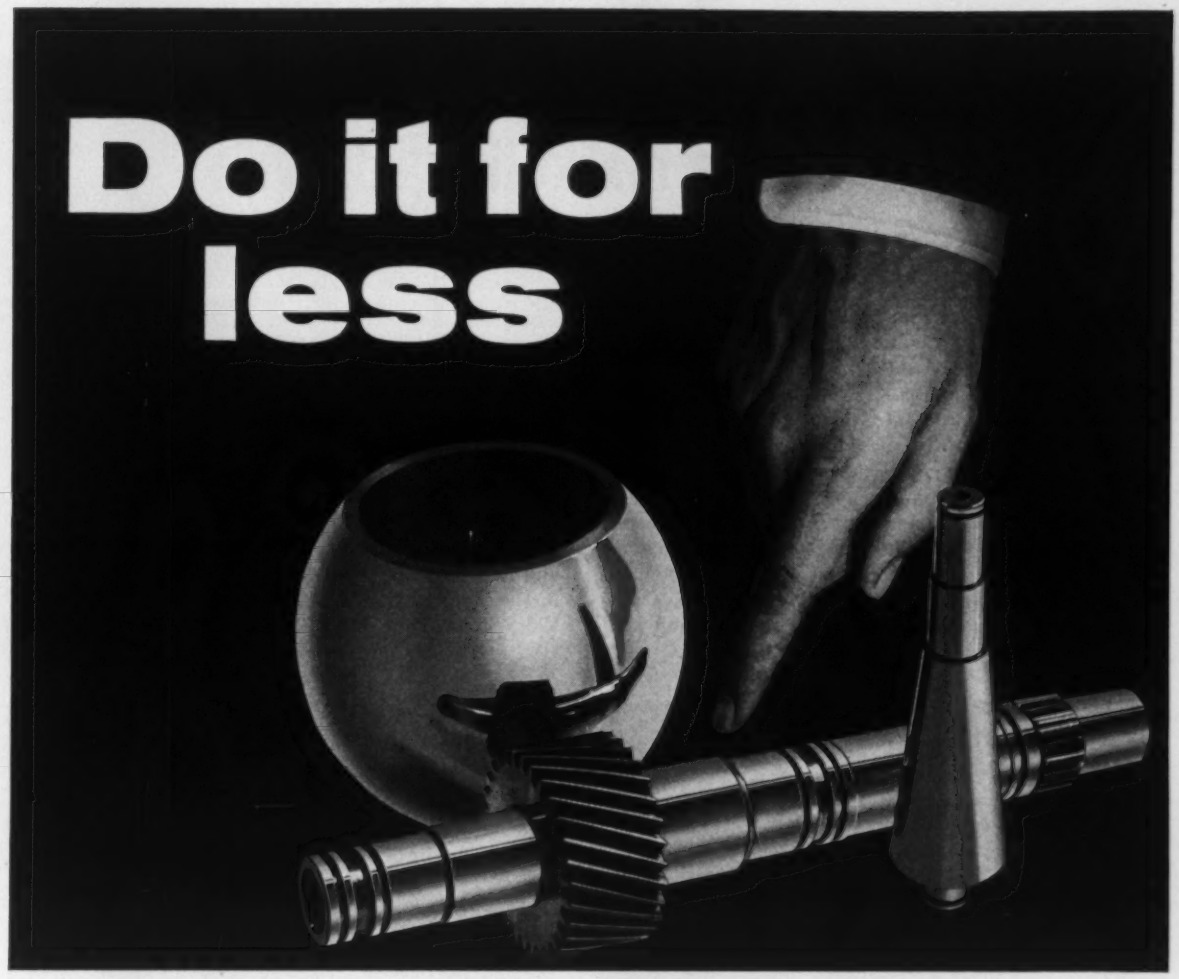

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You add sales appeal to your product with Stainless Steel. Your designers will tell you that Stainless Steel gives wings to their imagination. They can save weight, because Stainless is so strong they don't have to "over-design." And reduction of weight can cut handling and shipping costs. Stainless improves appearance with a genuine gleam—a gleam that is as deep as the metal itself, not just a thin coating. And Stainless is not difficult to fabricate and join. Investigate new markets and uses for Stainless Steel in your products; write for further information. United States Steel, Room 6394, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS is a registered trademark.

The broiler of the future is Stainless Steel—and it's here today

This infrared broiler by South Bend Range Corporation, South Bend, Indiana, can broil meat in half the time it would take a conventional broiler. It is used in many leading restaurants, and its operation is based on direct infrared heat waves that travel at the speed of light. They heat only the meat, not the area around it. They cook a delicious meal in seconds instead of long minutes. These compact, highly efficient broilers are easy to keep clean and sanitary—prime requisites in any restaurant kitchen—because Stainless Steel's surface is so "dense" and smooth it does not harbor bacteria. For this reason, most good restaurant broilers and ranges—and most restaurant kitchens—are Stainless Steel.

A Stainless Steel cyclone could save you $50,000 a day

If a cyclone in a fluid bed cat cracker breaks down, it could cost a refinery $20,000 to $50,000 a day. This isn't likely if the cyclone is fabricated from Stainless Steel. Although Stainless cyclones are subjected to extreme heat, erosion, and sulfur corrosion, they *keep* their strength where other materials soon break down. Stainless Steel has outstanding corrosion resistance for a wide range of reagents, excellent high temperature strength and a smooth, easy-to-clean surface. The Ducon Company, Inc. of Mineola, N.Y., fabricates the cyclone shown here.

Stainless Steel milk cans pay for themselves

The John Wood Company, St. Paul, Minnesota, makes Stainless Steel milk cans and sells or leases them to dairies for use in milk dispensers. Even after 20 years of hard usage a Stainless Steel milk dispenser can will still be in excellent shape. And it will have a perfect attendance record—not one day's work lost . . . and no leakage. It will keep milk clean and pure. That's because Stainless Steel can be thoroughly cleaned thousands of times and still retain its smooth, impervious surface. You don't have to baby Stainless Steel; it's strong. Stainless Steel milk cans mean economy in the long run. There are practically no replacement costs because Stainless Steel milk dispenser cans just won't wear out.

Live-wire bank invests in Stainless Steel

This Stainless Steel drive-up bank window was made by Diebold Incorporated, Canton, Ohio. They chose Stainless Steel because it immediately reflects taste and quality. It looks better and works harder than any other metal—it stands up to the weather, drastically reduces maintenance costs. Since Stainless Steel's finish is as deep as the metal itself, it can never chip, peel or wear off. These advantages, together with Stainless Steel's fabrication ease and superior strength, make it the ideal metal for your use—and give your product a distinct marketing advantage because Stainless Steel invariably denotes quality to consumers.

Tank car leads a pure life—it's Stainless Steel

You can ship or contain corrosive chemicals in Stainless Steel tank cars with no worry about contamination. Many chemicals that eat away other metals have no effect on Stainless Steel because of its smooth, corrosion-resistant surface. There's less danger of spoiling one product with residue from another because of Stainless Steel's ease of cleaning. And because Stainless Steel is so strong, it can be used in thinner, lighter gages so over-all weight is reduced and payload increased. The car shown here was built in 1956 by General American Transportation Corporation and is still in excellent condition.

USS **United States Steel**

HOUGHTON QUENCHANTS

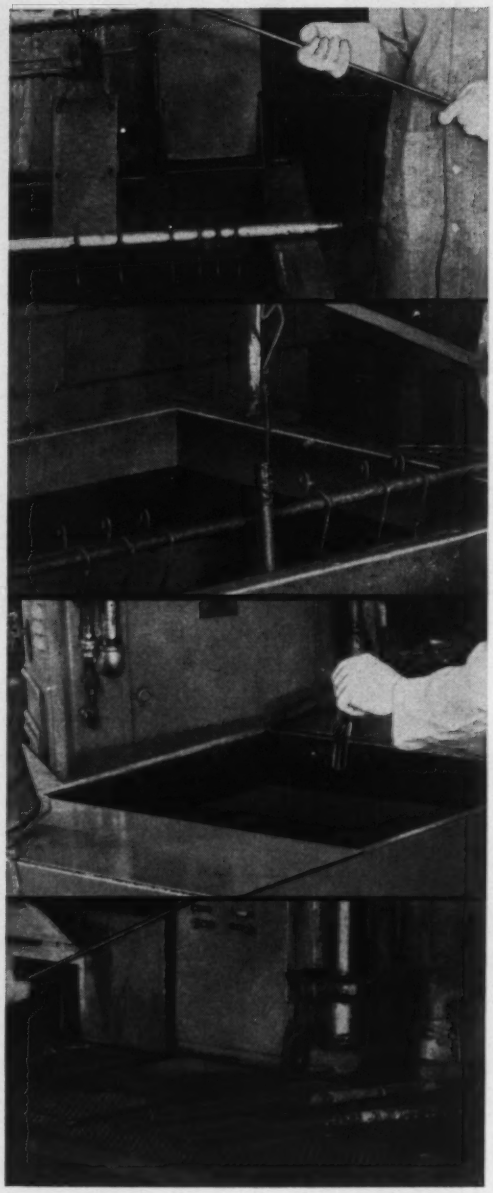
The role of the quench in precision heat treating

Illustrated here are four different quenches and techniques that help build the required strength, durability and precision into a variety of machined parts. To get precise physical properties, the selection of the proper quench is just as important in heat treating as temperature and steel analysis.

Heat treating—the vital "last step" in getting the most from metal—is an exact science that requires an expert's experience and judgment. Your Houghton Man offers you this type of help in selecting and servicing of a full range of oils and salts developed specifically for quenching, as well as salts for carburizing, hardening, tempering and nitriding. Call him today or write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

FREE QUENCHING BOOKLET!

New, illustrated, 70 pages of authoritative data on quenching materials and techniques. Write for your copy.



■ **For maximum hardness and wear resistance** Houghto-Quench "K" effectively transforms austenite to martensite. Houghto-Quench "K" is the high speed quench oil that quickly removes heat from steels . . . "the fastest quench this side of water".

■ **For good hardness and exceptional dimensional accuracy in quenching from liquid carburizing baths,** Houghto-Quench 4-C provides just the right cooling rate to insure adequate hardness without warping.

■ **For high hardness, accuracy and no spalling in induction heated parts,** Houghto-Quench "G" quickly removes the heat without danger of distortion or quench-cracks.

■ **For maximum dimensional accuracy and toughness,** Mar Temp Salt is the answer for precision parts which need long fatigue life. Martempering in Houghton salts provides physical properties difficult to obtain by any other quench method.

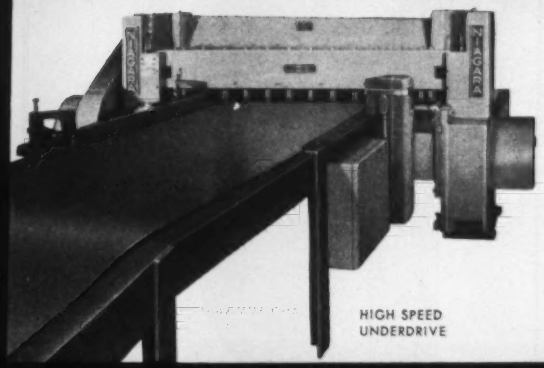
Houghton

INDUSTRY'S PARTNER IN PRODUCTION

Philadelphia • Chicago • Carrollton • Detroit • South San Francisco • Toronto

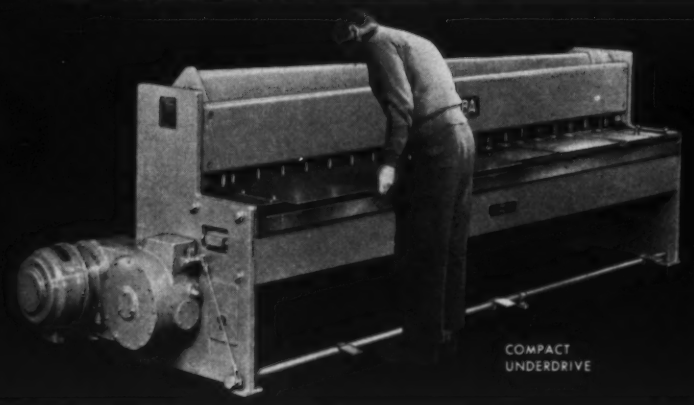
UNDERDRIVE

GAP TYPE

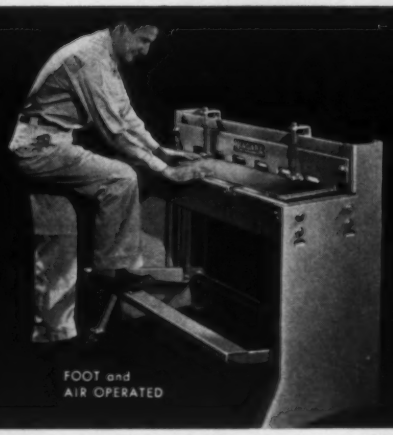


HIGH SPEED
UNDERDRIVE

choose the exact shear from the largest line anywhere!



COMPACT
UNDERDRIVE



FOOT and
AIR OPERATED

Why compromise on a "nearly right" machine? Choose *Niagara* and you'll choose exactly what you need — for 1" plate or paper-thin sheet metal . . . short pieces or 20' lengths . . . automated high speed production or single stroke operation. Niagara has the world's largest selection of squaring and other types of shears . . . *nearly 150 models.*

Rugged underdrive and gap type giants for heavy industry and steel warehouses. "Middleweights" for medium gage material. Economy power and foot shears for the sheet metal shop. Slitting and ring and circle shears. Yes, even hand snips! There's no line like the Niagara line . . . *anywhere!*

Next time you need shears *of any kind,* take advantage of the greatest range and variety in the business. Select Niagara.

Keep the full Niagara shear story on file. Send for any or all of these bulletins:

Underdrive Power Squaring Shears (to 1" plate)	Bulletin 69
Power Squaring Shears with Gap (to 5/8" plate)	Bulletin 72
Power Squaring Shears (Medium Gage)	Bulletin 73
Power Squaring Shears (Light Gage)	Bulletin 71
Air Power Squaring Shears	Bulletin 87
Foot Squaring Shears	Bulletin 80

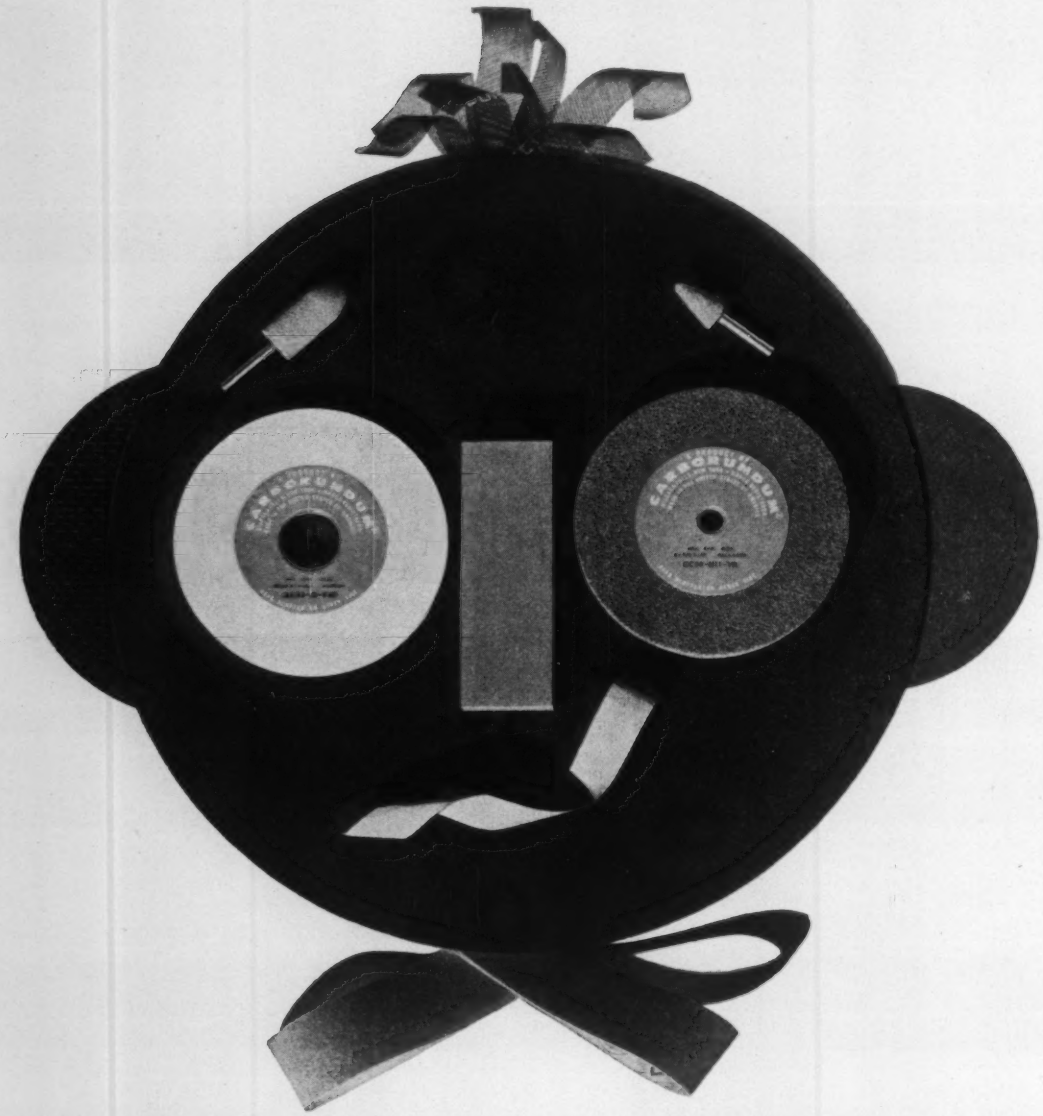
NIAGARA

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

District Offices and Distributors Everywhere

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

ABRASIVE SELECTION HAVE YOU CONFUSED?



Turn to National Standards by Carborundum for the answer!

There is no reason to get tangled in complicated abrasive selection problems... Carborundum's Catalogs of National Standards make selection and pricing easy. Selecting National Standards can also save you money: you have lower inventory requirements for your plant... fewer purchasing and stocking problems... no large inventories of custom-formulated items. Complete local stocks are maintained based on your trading area requirements. You have minimum delivery problems... National Standard abrasives are shelf items awaiting your order. What's more, they are performance proved throughout industry—outperform most custom-formulated products time and time again. National Standards by Carborundum offer a full range of grinding wheels, diamond products, coated abrasives and industrial specialities. Your guides to Standards are: Catalog 1489, National Standard Grinding Wheels and Industrial Specialities—Catalog 1555, National Standard Abrasive Belts, Rolls, Sheets and Discs. If you don't already have your copy, phone your Carborundum distributor or factory representative now. Niagara Falls, New York. **CARBORUNDUM**

H30-91

Quality metal products deserve "the finishing touch" of Mahon

another example: Tappan's new dishwasher and famous '400 RANGE SERIES' of appliances now finished in unique COMBINATION system

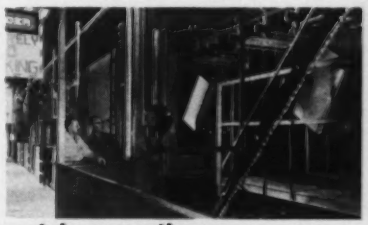
For any product finishing, *"Mahon designs equipment but engineers results"*. The recently installed Mahon finishing system for Tappan fully attests to the statement. Here's equipment designed to improve quality, provide painting versatility, expand capacity, reduce material inventories and slash finishing costs. Mahon, working with Tappan plant engineers, supplied the answer—an integrated finishing system to do washing, phosphatizing, dip painting, spray painting, plasticol coating and oven baking of about 300 different parts. Floor space? It *saves* 4000 sq. ft. of production area as it has now been relocated on the plant roof. Results? A versatile, efficient system that met all requirements *and* is now saving Tappan $60,000 a year. Can you afford not to call in Mahon on your metal cleaning and industrial finishing problems?

The Tappan Co. of Mansfield, Ohio, a quality leader in the home-range field has now expanded into the dishwasher market with advanced-design, big-capacity models... finished by Mahon.

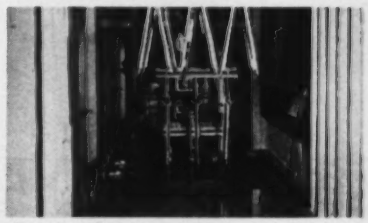
MAHON INDUSTRIAL EQUIPMENT
• Complete Finishing Systems • Metal Cleaning Equipment • Pickling Equipment • Painting Facilities—spray, dip and flo-coaters • Drying and Processing Ovens • Special Process Equipment

MAHON PLANT SERVICES
Steel Fabrication—weldments, machining and assembly • Structural Steel—fabrication and erection • Rolling Steel Doors—standard, Labeled and power-operated

WRITE FOR MAHON CATALOG A661.
ALSO IN SWEETS P. E. FILE.

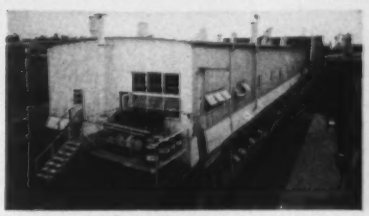


metal preparation, cleaning and phosphatizing is done in a seven-stage Mahon automatic-cycle unit.



dip coating or spray painting in same unit—dip tank is on tracks and automatically positioned.

plasticol coating is by high-pressure spray in Mahon water-wash booths with reclamation pans.

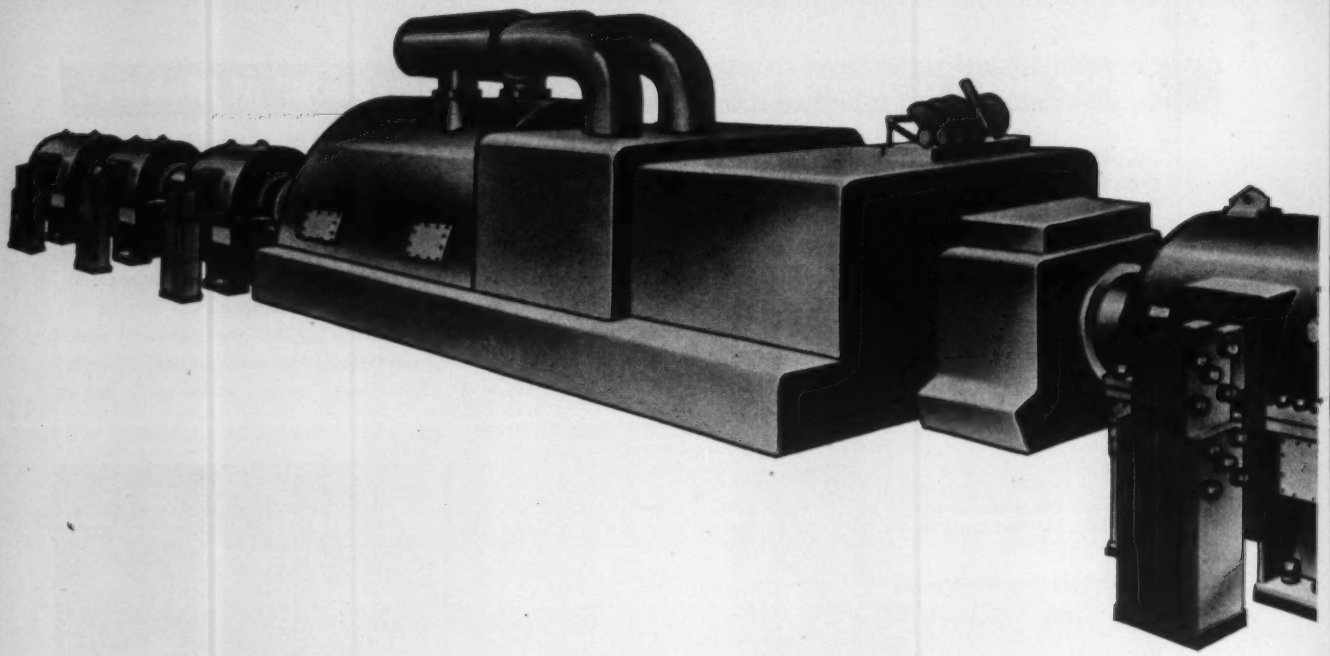


integrated system is self-housed on plant roof—made change-over easy, saved space.

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN
MANUFACTURING PLANTS—Detroit, Michigan and Torrance, California
SALES-ENGINEERING OFFICES—Detroit, New York, Chicago, Cleveland, E. Orange, N. J., Seattle, Wash., San Francisco and Torrance, Calif.
REPRESENTATIVES in all principal cities.

YOUR BIGGEST VALUE IS IN MAHON'S PLANNING AND ENGINEERING EXPERIENCE

MAHON

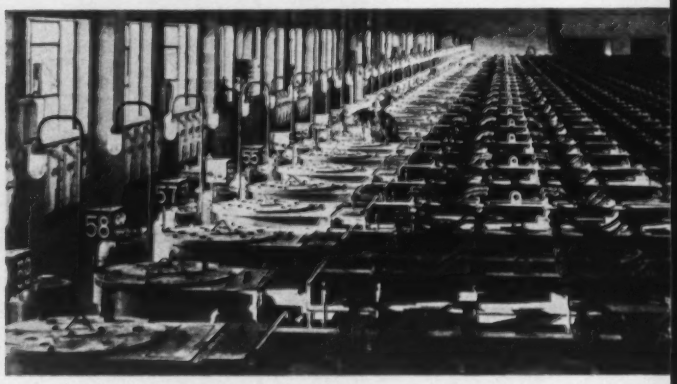


NOW

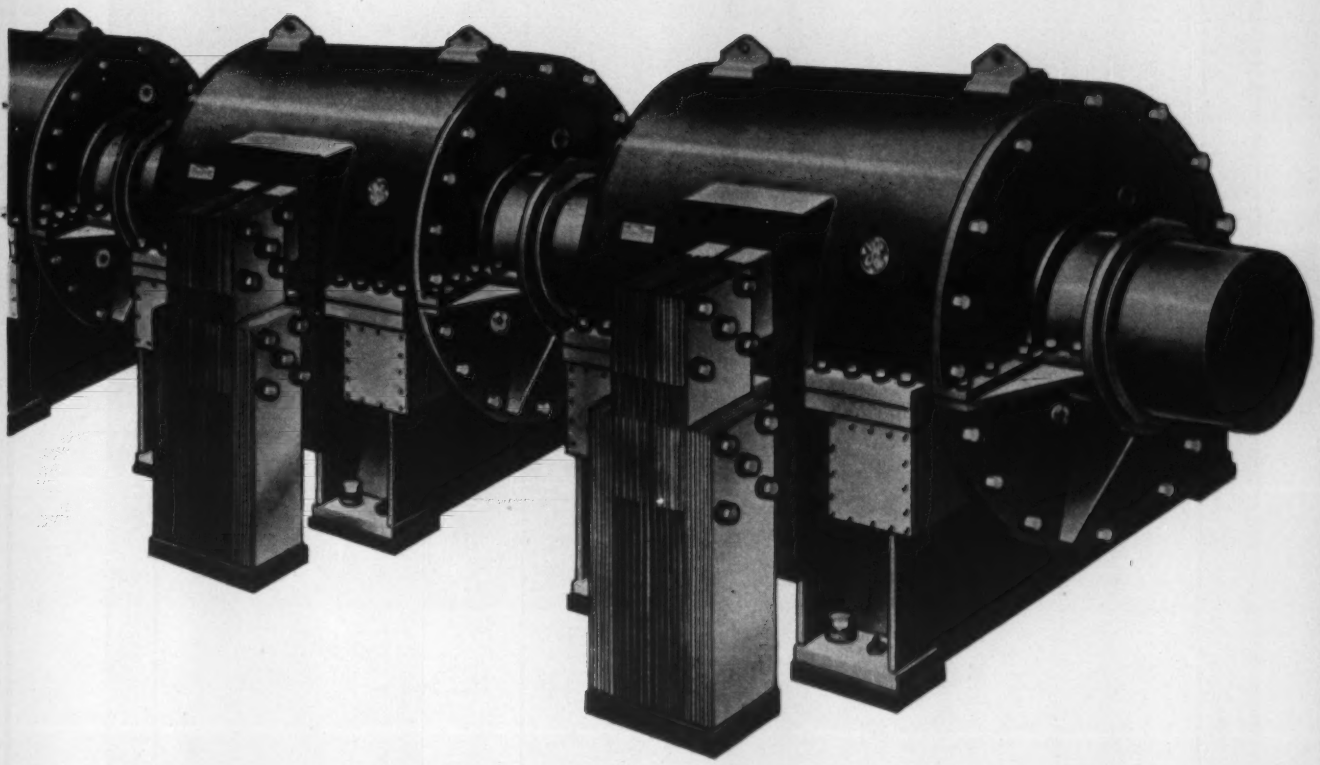
FROM GENERAL ELECTRIC

THE FIRST PRACTICAL

ALUMINUM REDUCTION pot lines require up to 150,000 amperes. The top of the page shows six *ACYCLIC* generators driven by a single steam turbine to provide a pot line with 150,000 amps, 400 volts.



CHLORINE PRODUCTION cells also require the high current which General Electric *ACYCLIC* generators can provide. A typical chlorine cell line could be powered by three *ACYCLIC* generators in series at 200 volts.



ACYCLIC GENERATOR

FOR EFFICIENT GENERATION OF VERY HIGH D-C CURRENT

The six ***ACYCLIC*** generators shown above will produce 150,000 amperes, 400 volts d-c at above 98 percent generator efficiency. The secret: a century-old principle and a recent G-E breakthrough in dynamoelectric design.

The first generator, developed early in the nineteenth century, embodied the principle of acyclic generation—high-current d-c power produced directly rather than through commutation. But the acyclic principle required an effective means of current collection to be practical, and the only methods available were complex sliding brush systems.

Now, General Electric has developed a brushless liquid metal collector system which transfers current efficiently even with hundreds of thousands of amperes coursing through it.

Aluminum pot lines, chlorine cell lines and a host of special applications require the large volumes of high-current d-c power which these ***ACYCLIC*** generators can produce.

If you require high-current d-c power, investigate this new look in generation. Call your General Electric industrial sales engineer or write Section 772–10, General Electric Co., Schenectady, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Large Motor & Generator Dept.
Schenectady, New York

THREADING AT 581 R.P.M.

Suburban Industries, Bensenville, Ill., is achieving these results with a LANDMACO 5C Threading Machine equipped with a 5/8" VVV LANCO Hardened and Ground Die Head. Both steel studs and continuously-threaded bars are produced at 581 r.p.m.

Chaser life is excellent. For example: 10,000 studs of B 1113 steel, having a 1/2" UN thread 3/4" in length, are produced between chaser grinds. In the rod application, with 1/2" 13 pitch UN threads in 12-foot lengths, 150 bars of B 1113 steel are produced between chaser grinds.

The 5C LANDMACO Machine is manufactured in a single-spindle model for threading all diameters from 3/16" to 5/8" to Class 4 fit. Lead screw and air-operated equipment available to increase machine efficiency. 518

LANDIS *Machine* COMPANY

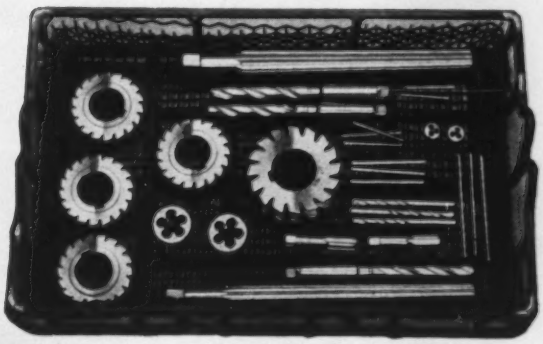
WAYNESBORO • PENNSYLVANIA

new process ***heat-treats high speed steel***

AT 1/2 SALT BATH COSTS,
PRODUCING CLEAN, BRIGHT PARTS!

VFC-150
2400° F. Maximum
Operating Temperature

- New Heat-Treat Process Controls the Surface Chemistry.
- Processed Parts are Always Bright.



BRIGHT HARDENING M-2 TOOLS

- Reamers, drills and cutters of various sizes were run together in the above vacuum unit.
- Preheat 1550° F. High Heat 2250° F.
- Surface Condition — Clean and Bright as shown in photograph taken after treatment.

See this process. Call for an Ipsen representative to give you full details.

AUTOMATIC Ipsen HEAT TREATING UNITS

IPSEN INDUSTRIES, INC. DEPT. 723 P.O. BOX 500 ROCKFORD, ILLINOIS

4-piece assembly replaced by one aluminum extrusion

Hundreds of manufacturers have taken a fresh look at their products. In doing so, they have discovered that extrusions like the one shown can now cut down on hand labor and replace costlier assemblies . . . or replace rolled, crimped, welded or machined parts.

Production techniques and aluminum alloys have improved rapidly. So it takes a specialist—an experienced independent extruder—to keep you up to date with all the cost-saving possibilities that extrusions now offer. To be sure you're taking advantage of possible cost savings, have a nearby extrusion specialist analyze your product line promptly.

It's good business to know one of these independent extruders . . . specialists who are supplied with top-quality aluminum ingot by Aluminium Limited.

...and then there was one:

MAIL THIS COUPON FOR EXTRUDER NAMES AND ADDRESSES.

Aluminium Limited Sales, Inc., Dept. IA-12
111 W. 50th St., New York 20, N. Y.

Please send me a list of Independent Extruders in this area.

Name_____

Title_____

Company_____

Address_____

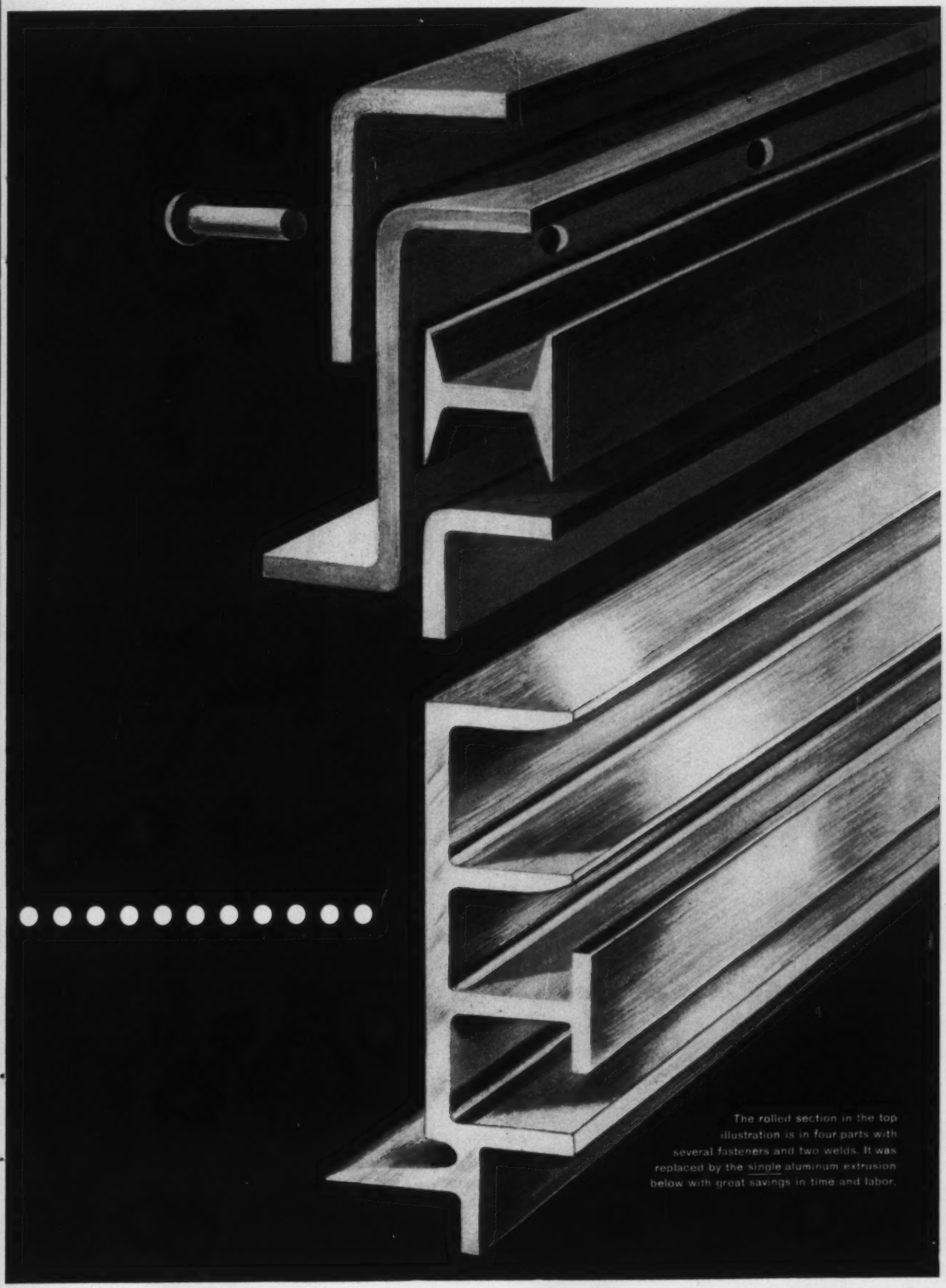
City_____ State_____

ALCAN

Supplying metal and ideas to companies that work with aluminum

ALUMINIUM LIMITED

Aluminium Limited Sales Inc., 111 W. 50th St., New York 20, N. Y.



The rolled section in the top illustration is in four parts with several fasteners and two welds. It was replaced by the single aluminum extrusion below with great savings in time and labor.

'BUFFALO' FG FANS

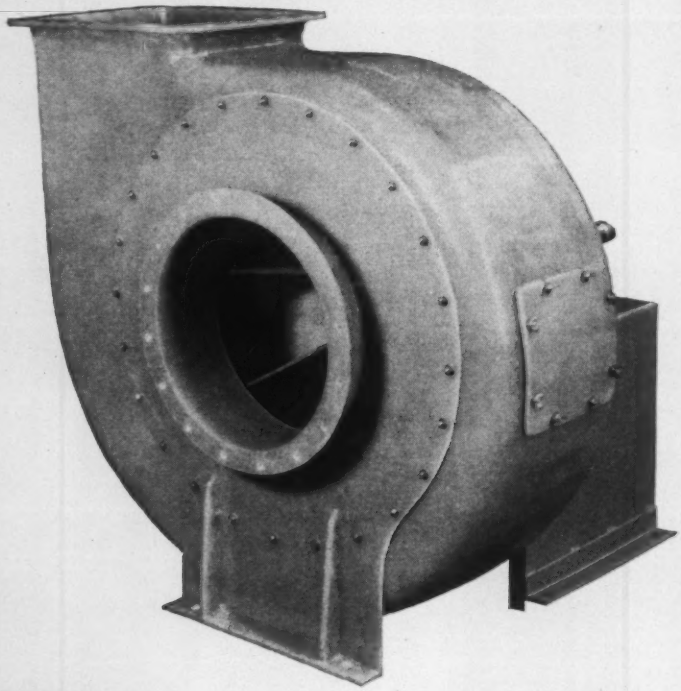
It takes more than an ordinary fan to exhaust many of the highly corrosive fumes encountered today... to do the job at a reasonable cost... and to resist chemical attacks.

'Buffalo' fans, with resin bonded fiber glass housings... fiber glass protected wheels and shafts, are that kind of fan.

Designed for temperatures to 225° F and higher, thermosetting plastics used on 'Buffalo' Type FG fans will not support combustion. They have high impact strength, excellent resistance to a wide range of acids, salts, gases, organic materials and other corrosives. The fans are statically and dynamically balanced to assure vibrationless performance.

A wide selection is available in capacities to 34,000 cfm and pressures up to 10" static. The Buffalo representative in your area can quickly provide helpful information related to your individual requirements. You can save time and money by consulting him.

...Fiber Glass Protection Against Corrosive Fumes



AIR HANDLING DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

A Metal Problem . . . With Complications

The hour is late . . . the girl impatient . . . and a rough metal problem has to be solved *tonight*. Pressure that breeds ulcers. Pressure that might not exist if this harried engineer had up-to-date information on HAYNES alloys.

HAYNES alloys solve tough metal service problems—severe abrasion . . . metal-to-metal wear . . . corrosion . . . difficult or impossible lubrication . . . high temperatures. They are available in any shape, any quantity, any size. As finished parts . . . ready to use . . . or as rough castings, forgings, bar stock, sheet, plate, or wire.

Our 32-page properties booklet details the characteristics of 15 HAYNES alloys. Send for it. Our engineers are at your service, too.

Address Inquiries to Haynes Stellite Company, 270 Park Avenue, New York 17, New York

HAYNES
ALLOYS

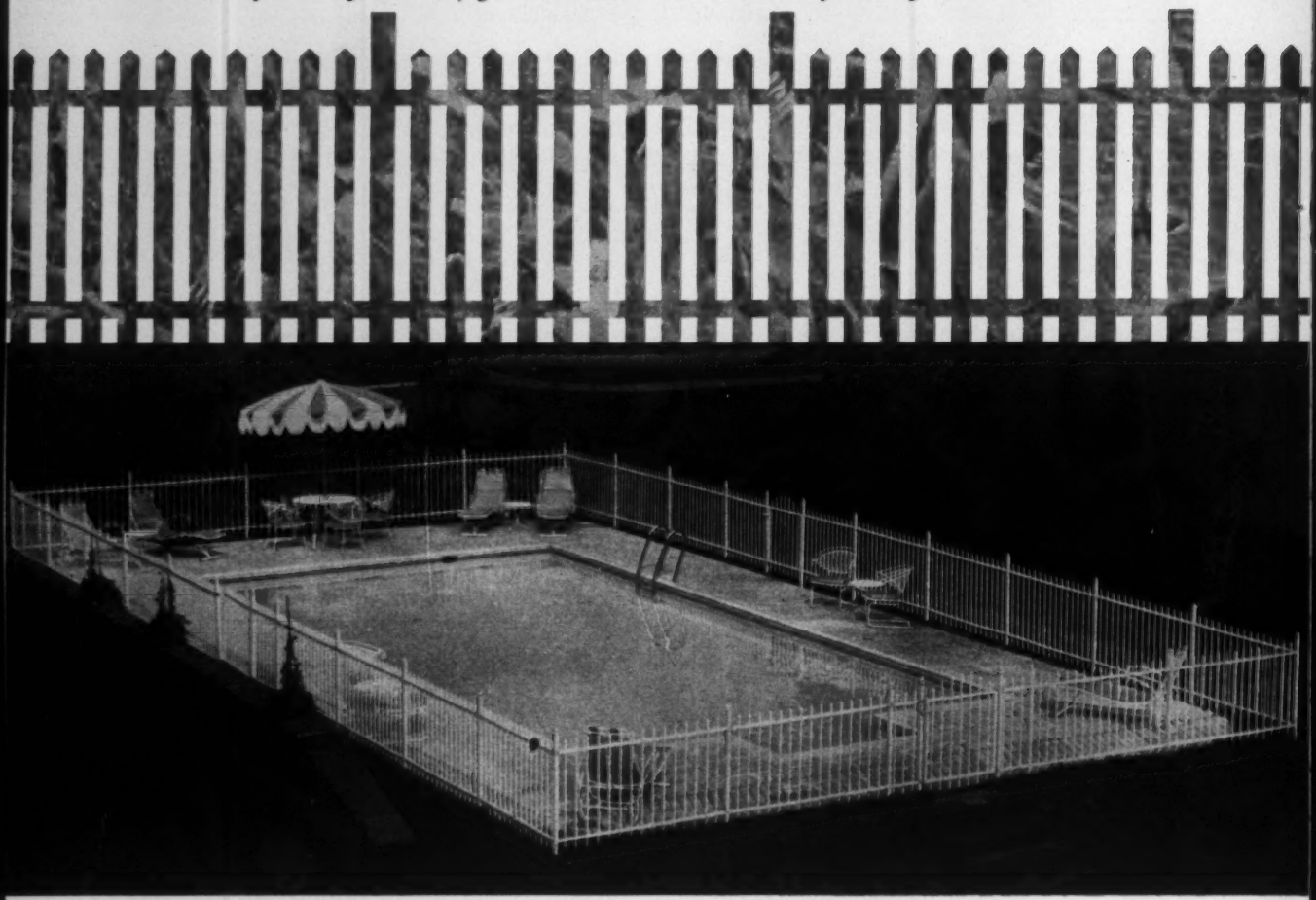
HAYNES STELLITE COMPANY

Division of
Union Carbide Corporation,
Kokomo, Indiana

UNION CARBIDE

The terms "Haynes" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

The rich look of wrought iron, yet Westmoreland's new fencing is . . .



GUARDED BY GALVANIZED STEEL

You're looking at an attractive new idea in fences from Westmoreland Metal Manufacturing Company of Philadelphia. It's a steel fence made of square tubing which duplicates the traditional appearance of wrought iron. But it costs less and virtually eliminates maintenance problems.

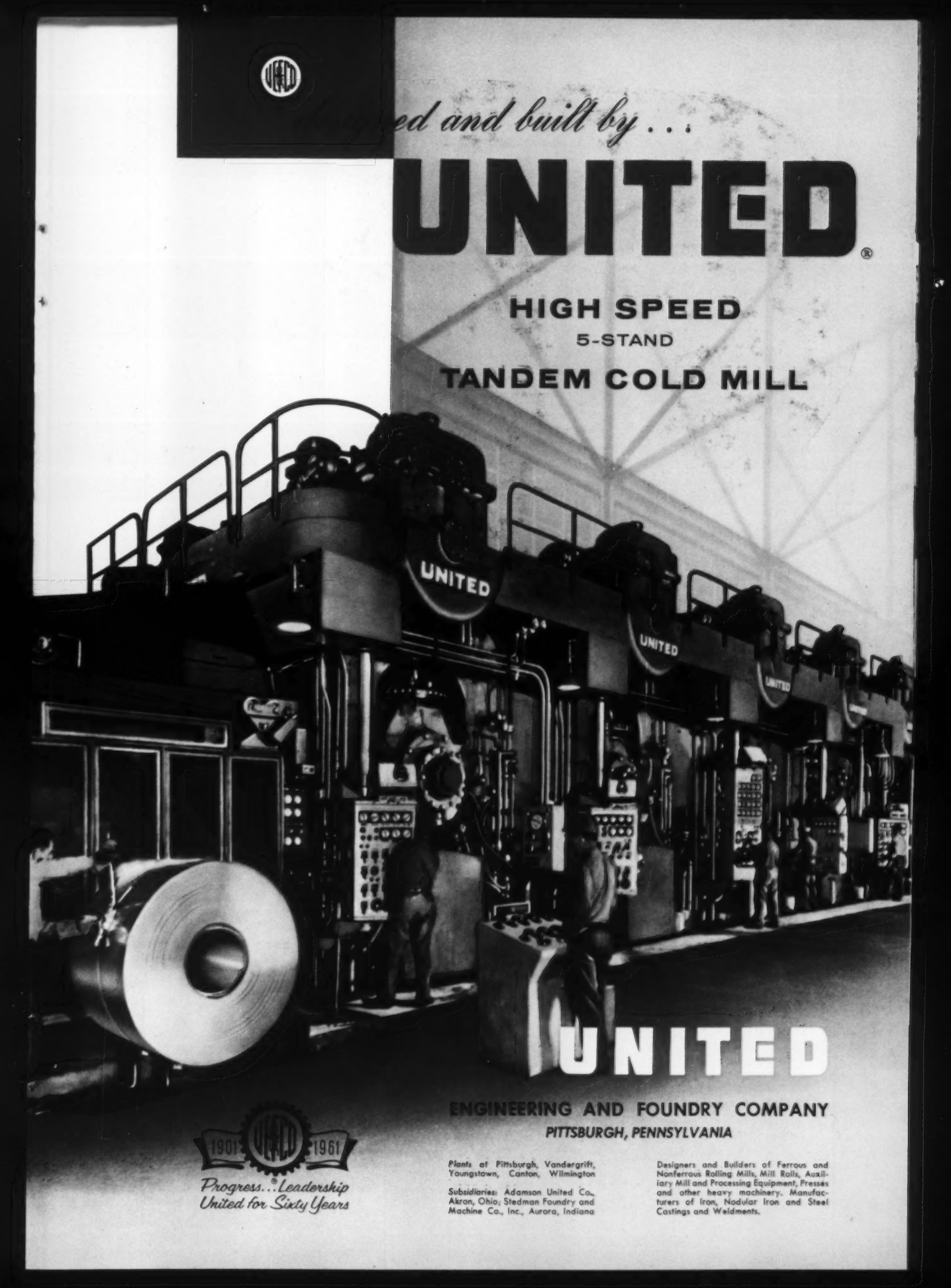
It's made of galvanized steel, which means lasting protection from the punishing whims of Old Man Weather. Come rain, come snow, the zinc coating stays on guard for keeps. Galvanized steel also helps hold down the price of this fence because of its low initial cost and the ease with which it can be formed into desired shapes.

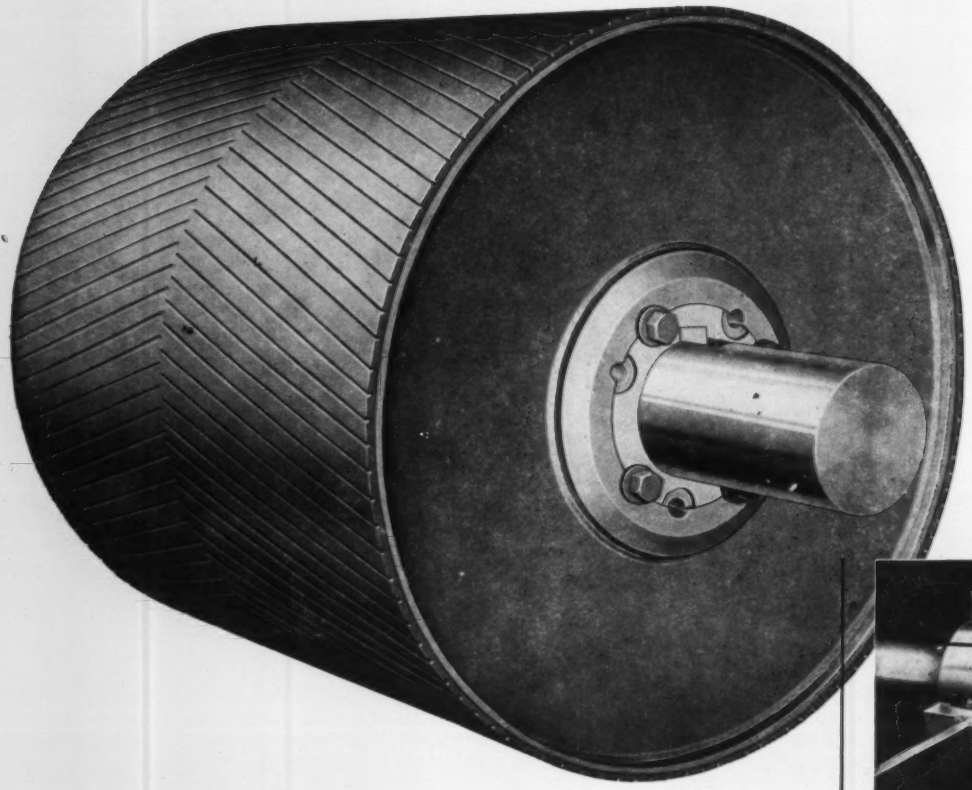
WEIRKOTE® IN PARTICULAR! The galvanized steel used in this new fence line is National Steel's Weirkote. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Westmoreland president, Irving H. Kutcher, reports: "Weirkote comes through our fabricating operation without any harm whatsoever to its protective zinc coating. We never have to worry about chipping or peeling." Weirkote is manufactured by two National Steel Corporation divisions, Weirton Steel and Midwest Steel. Write Weirton Steel, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

Divisions of
NATIONAL STEEL CORPORATION


ed and built by . . .
UNITED®
HIGH SPEED
5-STAND
TANDEM COLD MILL
UNITED
UNITED
UNITED
UNITED
ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA
1901 1961
Progress...Leadership
United for Sixty Years
Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington
Subsidiaries: Adamson United Co., Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana
Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



AMERICA'S NO. 1 STEEL CONVEYOR PULLEY!

There are more Taper-Lock Steel Conveyor Pulleys than any other operating on big jobs. Why? Simply because of the dependable performance they deliver under the toughest conditions.

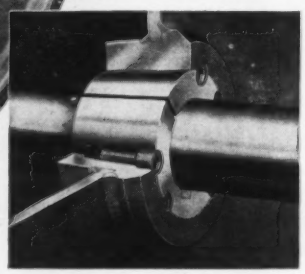
The rims, discs and hubs are *steel* — and they are fused together into jointless drum construction for (1) maximum strength with minimum weight, (2) exclusion of dirt, water and steam, (3) terrific shock resistance. Every weld is made by the submerged arc process giving deep penetration and exceptional strength. Rims are accurately die formed in the smaller diameters and rolled in the larger diameters. Pulleys with 26″ and wider faces have interior discs that add to the trueness, rigidity and strength of the rims.

Dodge offers the world's biggest range of stock sizes. Diameters from 6 inches to 8 feet — all face widths, crowned or flat. Standard or special rubber lagging available. Ask your local Dodge Distributor — or write us for a technical bulletin.

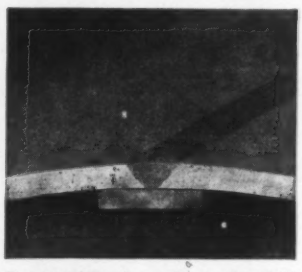
Dodge Manufacturing Corporation, 800 Union Street, Mishawaka, Indiana

The Products with the Pluses... **DODGE** *of Mishawaka, Ind.*

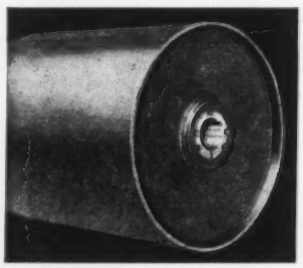
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the white pages of your phone book. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods.



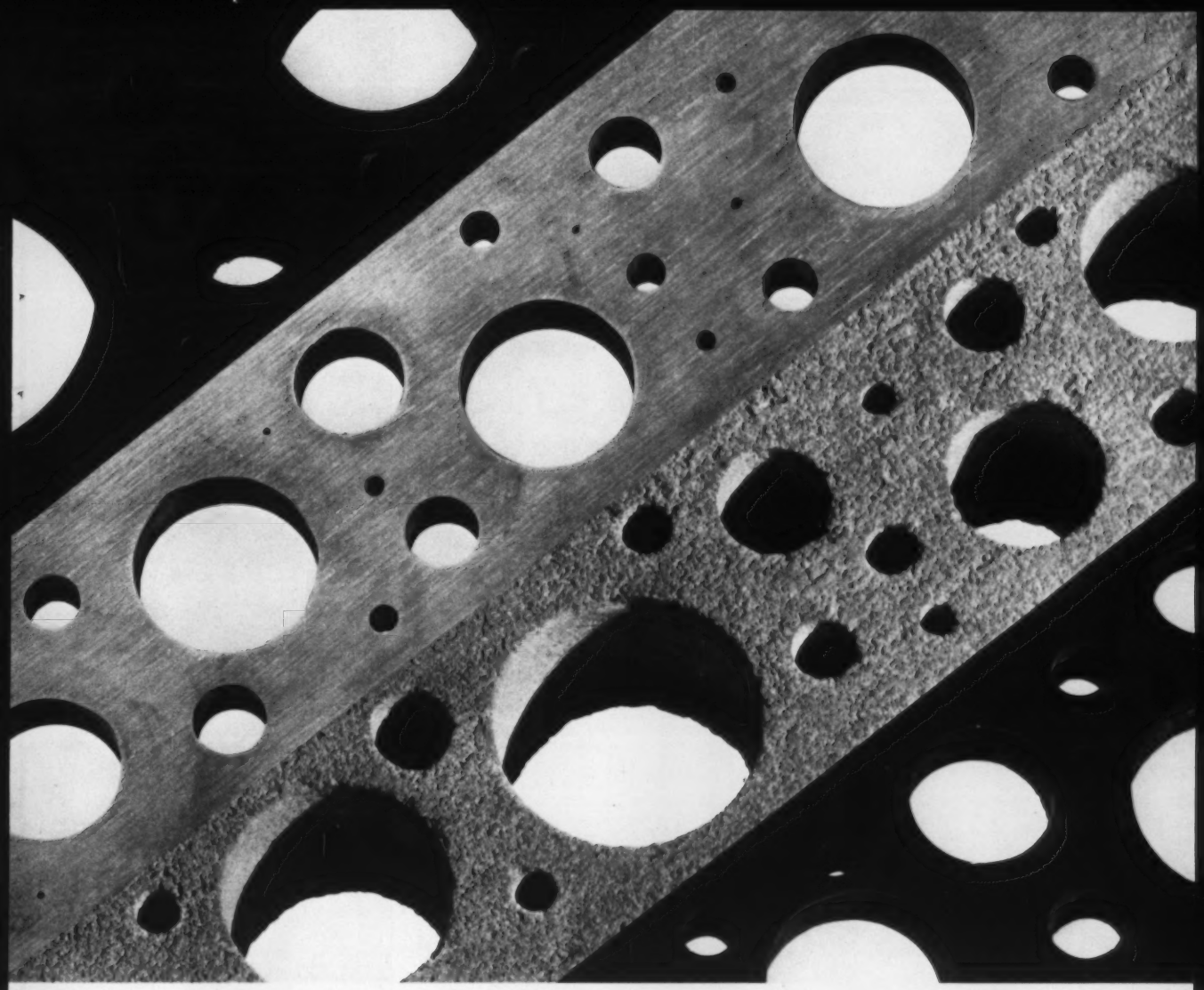
No "walking" on the shaft with Taper-Lock. Full length contact of hub. Holds under heavy loads and shock. Easy on — easy off.



Patented Back-up Bars give full rim strength through 100% weld penetration. Diametrically opposed bars insure balance.



Jointless construction creates a drum fully sealed against conveyed materials of all kinds as well as dirt, water and steam.



There's a Black & Decker Drill for every hole on this page

And now for every Black & Decker Drill (all 58 of them), there's 20-25% longer life, extra drill power, handier handling. These built-in bonuses attest best to the tool engineering and design that never follows, always leads. ⇨ ⇨ ⇨

New Motor Varnish—insulates motor wire for running-temperatures up to 38% higher, increases overload capacity as much, and adds to motor life.

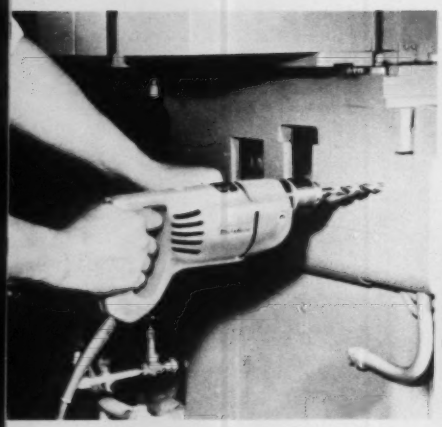
Advanced Commutator Lead Fusing gives better bonding at higher temperatures. New carbon brushes get 50% longer life, cut commutator wear.

Improved Cooling System uses new-design fans, larger ventilating holes to make every Black & Decker Drill the coolest handling tool for the job.

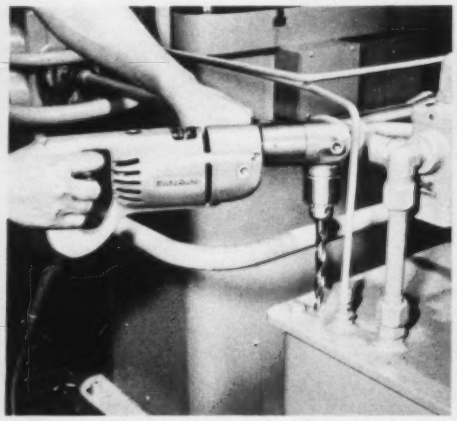
More Power Per Pound in every B&D Drill helps you get through your work quicker and cleaner. Contour handles afford the easiest grip, too.

BLACK & DECKER'S LONGER LIFE LINE

58 B&D Drills get through the work faster, easier . . . have more drill power to last longer



NEW! ½" End Handle Drill is ideal for tough maintenance and production jobs. So powerful it has 48 ft./lbs. lock torque, highest of comparable tools.

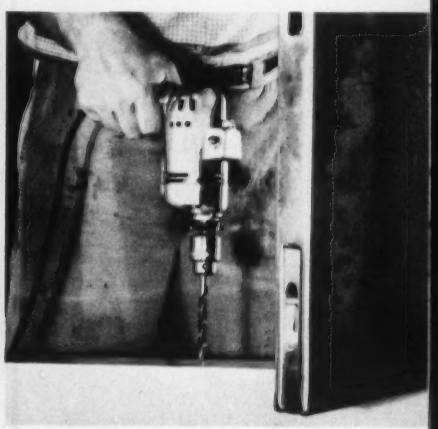


NEW! ½" Right Angle Drill has a head for getting around corners, in tight places. Reverse the end attachment to speed up or slow down.

REDESIGNED! ¼" End Handle Drill has a slimmer, more compact profile, ball-bearing construction. Features long-life, cooler-running motor.

Magnetic Drill Press in ¾" and 1¼" sizes, sticks to the job in any position. 2-speed 1¼" also available. All models reverse. Manual or remote control.

¾" Heavy-Duty Drill has more muscle than any drill its size, positive drive clutch, proved reverse power that can pull a full-sized Diesel locomotive.



⅜" Reversible Scru-Drill® is a drill and screwdriver in one. Drives or removes screws, nuts and bolts; drills ⅜" capacity in steel, ¾" capacity in wood.

THE BLACK & DECKER MFG. CO., Dept. D-16
Towson 4, Md. (In Canada: Brockville, Ont.)

☐ Please arrange for a demonstration of.....

.....

☐ Please send me more information on.....

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Name.....Title.....

Company.....

Address.....

City.....Zone....State.....

☐ Vacuum Cleaners

☐ Screwdrivers

☐ Hammers

☐ Portable Grinders

Black & Decker®

CUTS MAN-HOURS TO MINUTES

Every bit counts . . . when you go through maintenance and production jobs with any one of Black & Decker's 58 drills. Power? B&D's newly beefed-up motors won't back down in the toughest going. Handling? When you grip a B&D Drill naturally, it's never off-balance, always easy to handle. Durability? Black & Decker Drills lead a rugged life — and love it! You'll find B&D tools are sold by leading distributors everywhere. *For sales or service, look in the Yellow Pages of your telephone book under . . .* TOOLS ELECTRIC

★★★ the new and better galvanized steel sheets

Do you have a job that requires top quality galvanized steel sheets? If so, our LEONITE sheets are just what you need. Our fully integrated and modernized strip mills and Sendzimir continuous galvanizing line are working at full capacity to produce superior corrosion-resistant LEONITE galvanized steel sheets. There is an ever-increasing overseas demand for LEONITE because it has a special-processed non-flakable zinc coating which makes it ideal for deep drawing. It is widely used for building material, ducts, furnaces, automobiles, refrigerators and numerous other household appliances.

This is just one integral part of NKK's mammoth enterprises. As the Orient's largest steel producer engaged in both steelmaking and shipbuilding, NKK's 30,000 engineers, specialists and workers are producing high-quality steel products.

NKK

NIPPON KOKAN K.K.

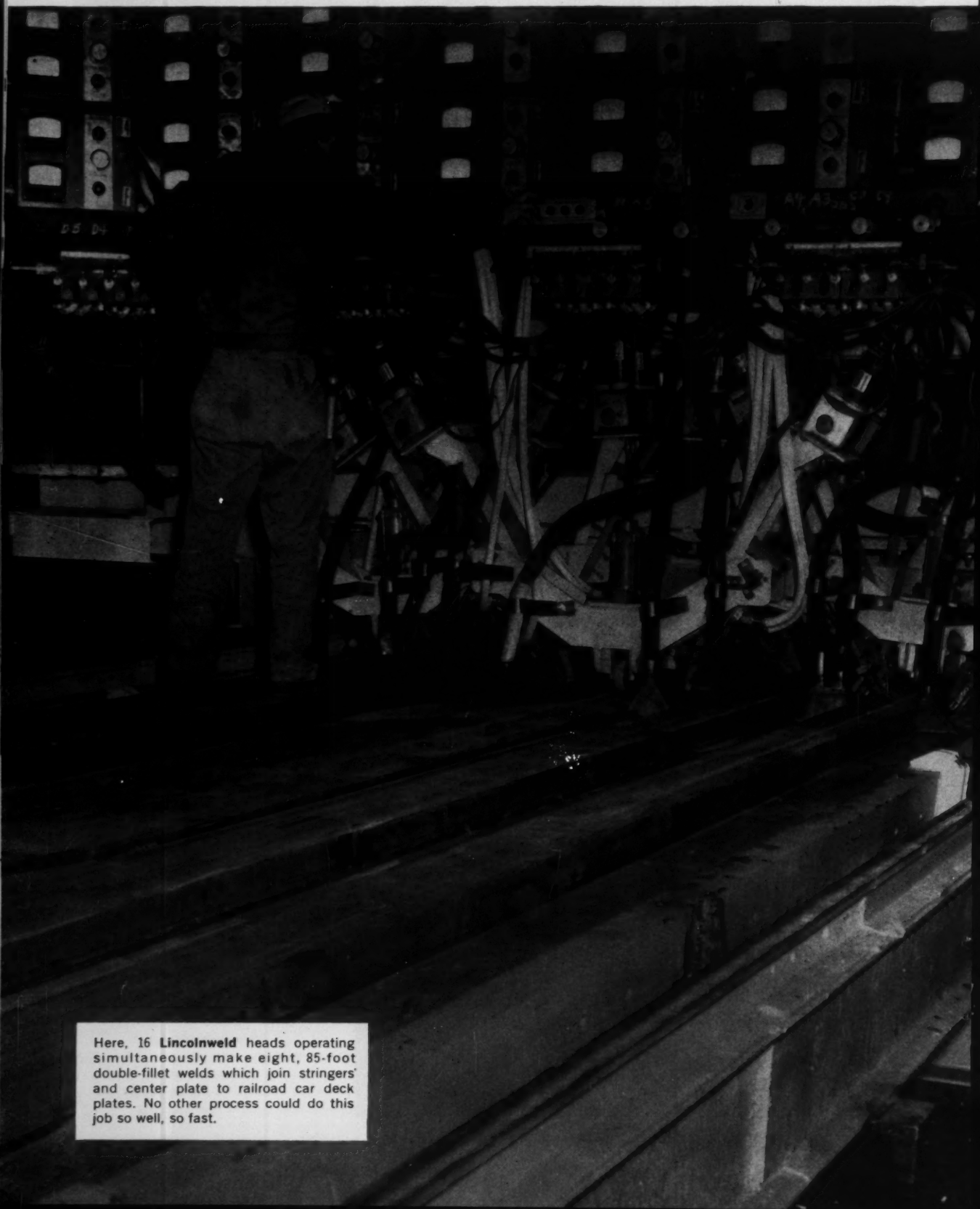
Otemachi, Chiyoda-ku, Tokyo, Japan

«Overseas Offices»

■ **New York:** Rm. 1115, 39 Broadway, New York 6, N.Y., U.S.A. ■ **Düsseldorf:** Kreuzstrasse, 34 11, Düsseldorf, West Germany ■ **Singapore:** Rm. 414, Shaw House, Orchard Road, Singapore

You can count on . . .

LINCOLNWELD SUBMERGED ARC WELDERS.



Here, 16 **Lincolnweld** heads operating simultaneously make eight, 85-foot double-fillet welds which join stringers and center plate to railroad car deck plates. No other process could do this job so well, so fast.

...FOR PERFECT STARTS EVERY TIME

Photo on the left shows an expensive, fully-automated submerged arc setup with 16 welding heads. Press the button. Can you count on every arc to start perfectly? Every time? This manufacturer can. He chose **Lincolnweld** equipment. Because he knows its welding dependability, ruggedness and easy serviceability will protect his investment and guarantee production by consistently delivering good welds . . . fast . . . at low cost.

Here, single LAF **Lincolnweld** head is used to make large fillet welds on bridge sections at speeds not possible by any other process. Note conveniently-mounted controls which let operator govern process at all times. No involved electronic circuitry to get out of order. Components are easily serviced by shop electricians. Lincoln automatic submerged arc heads are made for AC or DC welding, in shop or in the field; can be used singly or in various combinations to get higher speeds, lower-cost welds.

For short production runs, manual **Lincolnweld** gives you the benefits of submerged arc welding . . . continuous wire feed, high speeds and deep penetration . . . without the expense of fixturing. Here, ML-3 gun, propelled at pre-set speed by serrated wheel resting on work, provides a degree of mechanization and control not possible with manual welding.

Parts with unusual configurations were once welded exclusively by stick electrodes. Now, however, you can take advantage of submerged arc welding even on these kinds of joints with the ML-3 or the ML-2 shown here because of their inherent versatility. Result? Higher speeds, lower costs, better quality . . . at low initial capital outlays. See **Lincolnweld** submerged arc equipment in action. Contact your local Lincoln field engineer, a specialist in welding. Or, write for information on this equipment now.

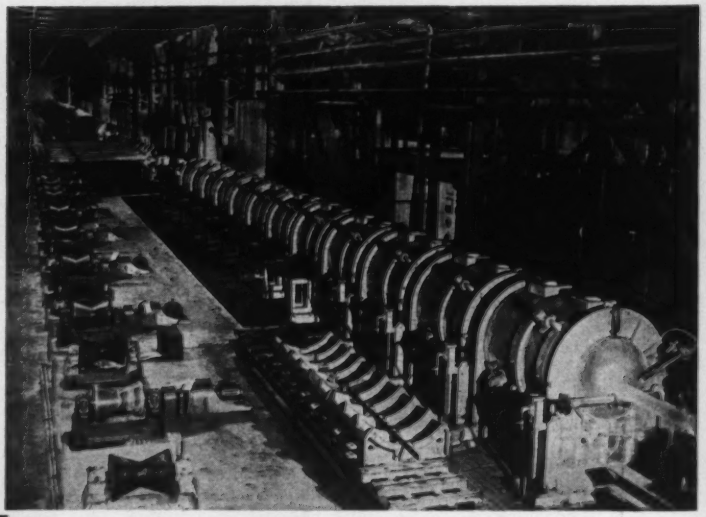
THE LINCOLN ELECTRIC COMPANY • DEPT. 1971 • CLEVELAND 17, OHIO

LINCOLN WELDERS

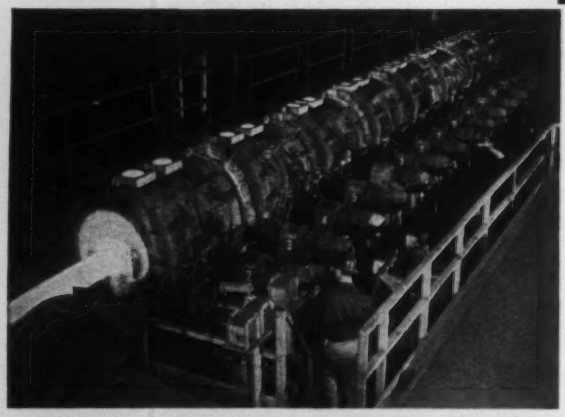
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES

NEW SLANTS ON HEAT PROCESSING FROM SELAS

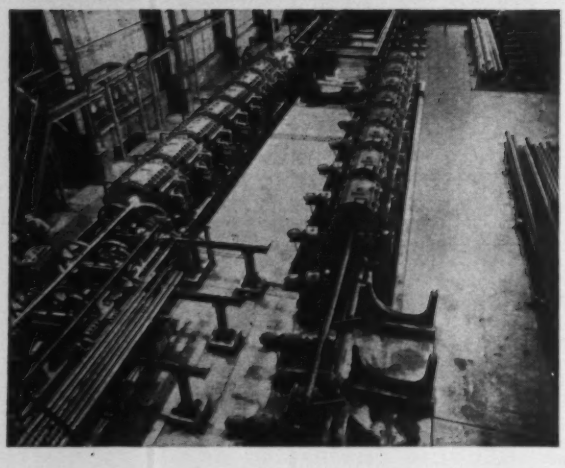
Here's how the Steel Industry relies



TUBING... *is normalized and, if required, stretch-reduced in this Selas barrel-furnace line. After forming and welding, the tubing is conveyed through a 48-barrel normalizing line with exit temperature approximately 1650° F. Stretch-mill product proceeds through 12 additional* GRADIATION® *furnaces which heat tubing to 1800°-1850° F. Entire process is automated, with line speeds matching mill speeds.*



BLOOM REHEATING *"on the fly," at rates of 198 tons per hour is accomplished in this continuous Selas barrel-furnace line. Reheating time of* only 3 minutes *reduces scale, amounting to a saving of 3 tons of steel per hour. Automated handling saved enough to pay for equipment in first 1½ months! Occupying floor area only 63' x 11', this continuous furnace assures uniform rolling temperature within each bloom and from piece to piece.*



SHORT-CYCLE HEATING *of seamless tubing for oil-country application is a typical cost-saving operation for Selas barrel-furnace lines. This overall view shows hardening (left) and tempering (right) lines, with automatic transfer between these treatments. Eight barrels per line. Advantages include: uniform properties throughout, negligible scale, reduced floor space requirements, and high degree of controllability.*

on Selas barrel-furnace lines

The installations on these pages graphically demonstrate how the steel industry relies on Selas barrel-furnaces to

- cut operating costs
- increase production rates
- reduce handling and labor requirements
- save valuable floor space
- improve product quality

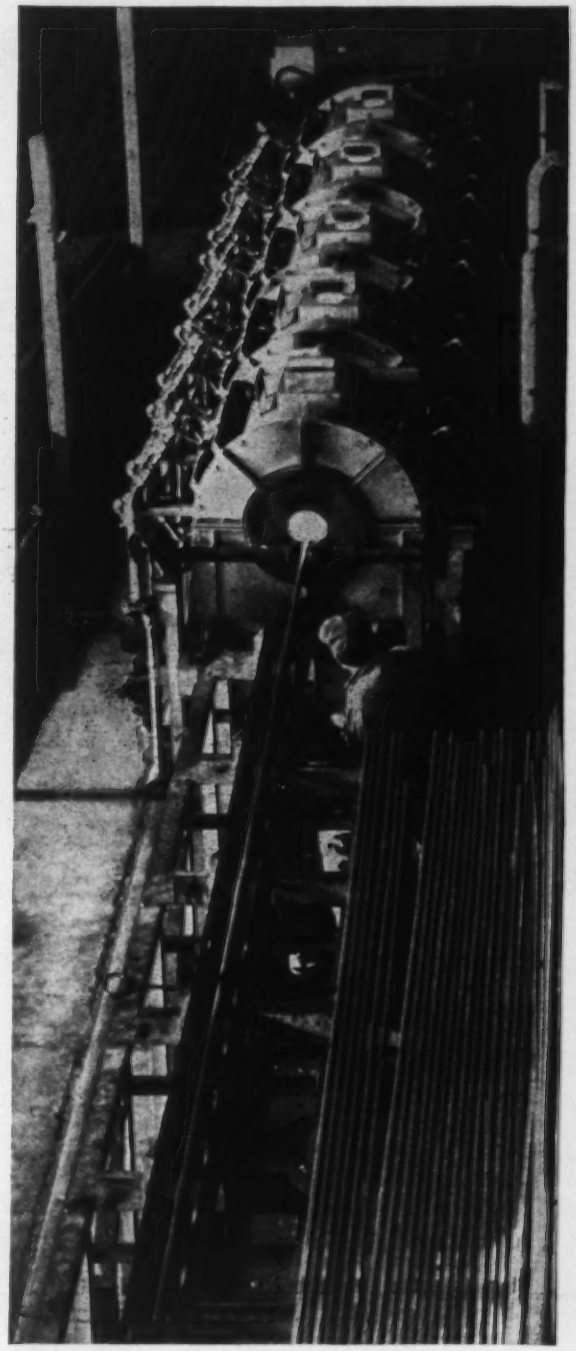
Specifically designed and custom-built to meet individual production requirements and job specifications, Selas barrel-furnace lines employ time-proven standardized engineering features for long-time operating dependability and minimum initial investment. Acceptance? 446 Selas barrel-furnaces are at work in 49 separate heat treating lines for a variety of continuous applications including annealing stainless bars and tubing, heating billets for piercing, reheating pierced tubes for sizing, hardening and tempering oil country alloy and carbon tubing, etc. What's more, 96 additional units are now in various stages of construction.

At your convenience . . . without cost or obligation to you . . . a Selas field engineer would welcome the opportunity to survey your needs. For this personal service contact our Furnace Steel Mill Division, Dresher.

SELAS CORPORATION OF AMERICA
112 Dreshertown Road, Dresher, Pa.

EUROPEAN SUBSIDIARY: Selas Corporation of America, European Div., S.A., Pregny, Geneva, Switzerland. **INTERNATIONAL AFFILIATES:** AUSTRALIA—Major Furnace and Combustion Engineers Pty, Ltd., Melbourne; FRANCE—Societe Exploitation de Produits Industriels, Paris; JAPAN—International Machine Co., Ltd., Tokyo.

GRADIATION and DURADIANT are registered trademarks of Selas Corporation of America.



STAINLESS STEEL *bars up to 5¼" cross-section and lengths to 30' are continuously annealed, and other grades normalized in this compact line of barrel-type furnaces.* DURADIANT® *burners heat uniformly at high thermal gradient without flame impingement on the work, resulting in minimum oxide formation. Annular ring water-spray quench cools work quickly and uniformly for maximum straightness in the annealed product.*

SELAS

HEAT AND FLUID PROCESSING ENGINEERS
DEVELOPMENT / DESIGN / CONSTRUCTION

Spaulding FIBRE FACTS FOR ENGINEERS NUMBER 5

How to Achieve Permanence at Low Cost

by K. H. Alverson, Product Standards Director

Seldom is a high degree of permanence found associated with the characteristics of dielectric strength, rugged structural strength and arc resistance at such low cost as in Vulcanized Fibre. This permanence and strength allows the engineer to use Vulcanized Fibre to replace more expensive plated or coated parts even where insulating or arc resisting properties are not required.

The reason for Vulcanized Fibre's agelessness lies in the chemical action of its production which arrests the natural tendency of cellulose to deteriorate. This renders Vulcanized Fibre more stable than the hardest wood. (Corrosion, such as attacks metals, is completely precluded since Vulcanized Fibre has a non-mineral base.)

The permanence of Vulcanized Fibre in use is well illustrated by its application as insulation in transformers, switchgear, and circuit breakers. Parts such as corrugated duct spacers, arc chutes and barriers are subjected to terrific arc exposure and must maintain their form, strength and electrical properties for years under continuous operation in hot oil. Lightning arresters and high voltage fuses, made from Fibre tubing for protecting power line transformers, are still in service and operation, in satisfactory condition, after more than twenty years of use.

Industrial fuses with a fibre case and replaceable fuse link are one of the best known uses for Fibre tubing. If the fuse blows, the link is simply replaced and the fuse case used over and over again.

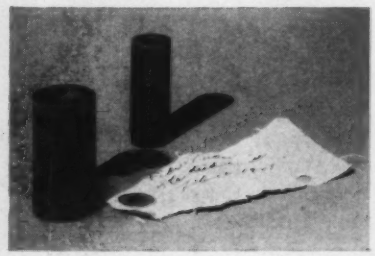
Fibre grommets are used to form a permanent locked-in-place insulator in metal assemblies, such as clocks, motors, etc. They will not deteriorate and fall out as will rubber. Fibre grommets for such applications are approved by the Underwriters' Laboratories.

Fibre is non-corroding, unaffected by oils, greases, solvents, etc. It withstands the pounding of heavy trains when used as track insulation under outdoor exposure. Easily formed into complex shapes for use in athletic equipment, welding helmets, etc., all of which must withstand harsh usage without failure.

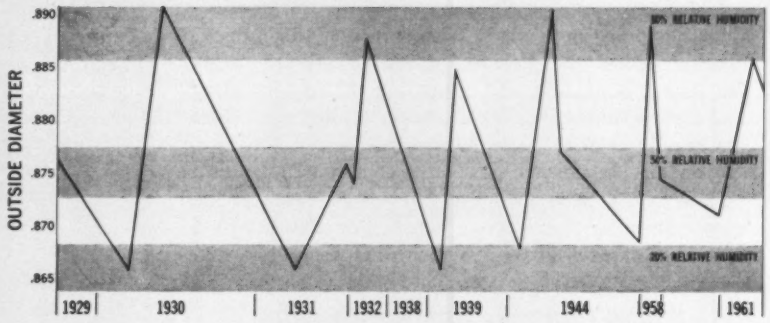
Trunk coverings, sample cases, factory trucks and waste baskets have been made for years of Vulcanized Fibre to take advantage of the light weight, abrasion resistance and permanence of the material.

Because of its many unique characteristics, Vulcanized Fibre offers a virtually endless variety of applications.

Spaulding Engineers who have been trained in Value Analysis can help you take advantage of the wide range of possibilities in designing to reduce costs through the use of Vulcanized Fibre parts. They also make available to you Spaulding's extensive fabricating facilities and experience in working with this extraordinary material.



While many materials deteriorate over the years, Vulcanized Fibre maintains its essential properties for decades. Note how the linen tag attached to Fibre tube samples in 1929 shows age, but Fibre tubes look and act as they did 32 years ago.



Long term test of fibre, which has been going on since 1929, shows that fibre still responds to wide humidity changes in the same way it did when test began. Predictable changes in dimension occur when fibre tubing is subjected to extremes of humidity. Tests such as these prove that there is no change in Vulcanized Fibre characteristics over long periods of time.

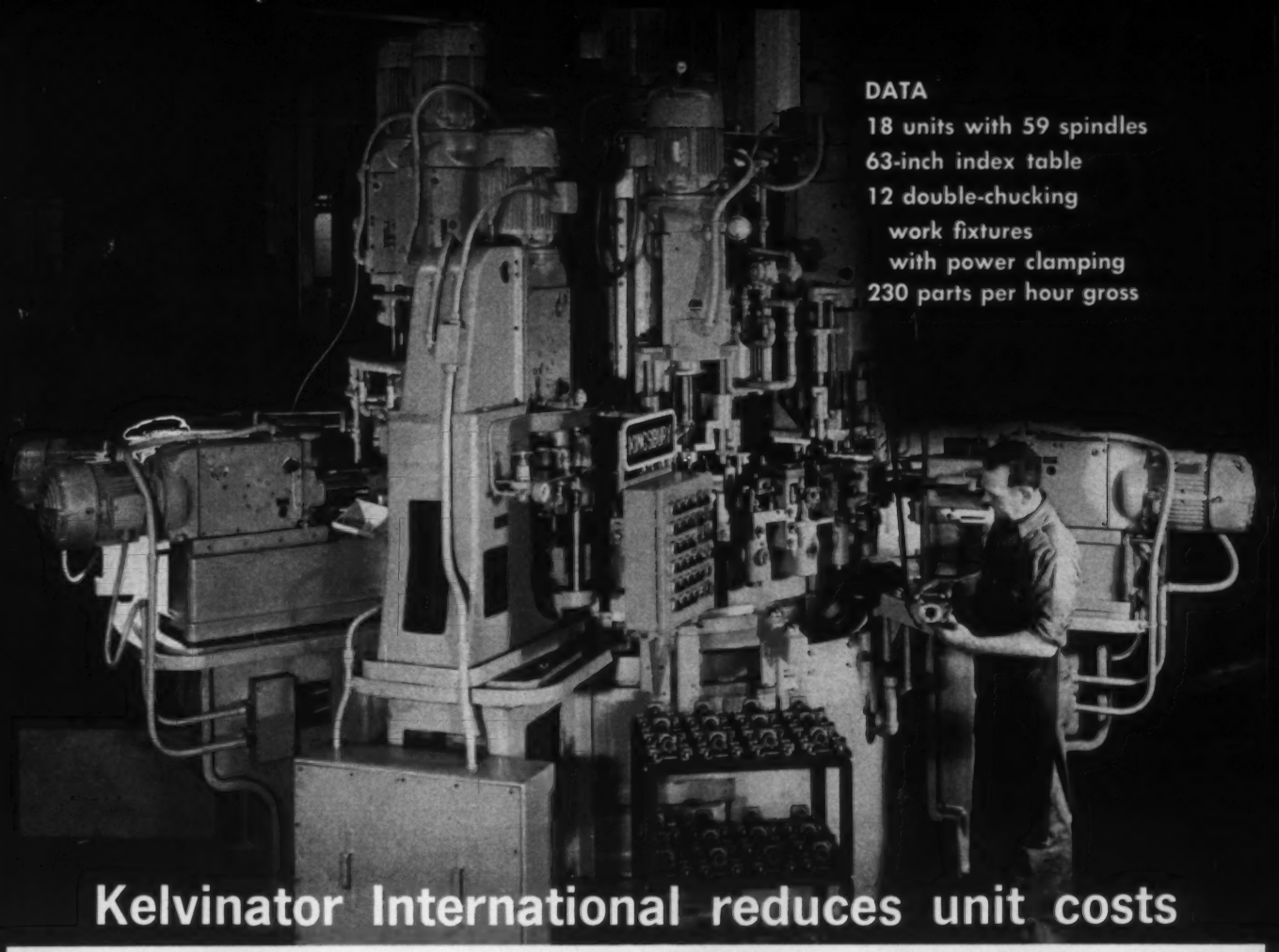
Be sure to add this FREE Literature to your reference files. *WRITE TODAY.*

New Value Analysis Brochure a detailed review of the Spaulding Value Analysis technique together with case histories of design improvement and cost reductions that have been accomplished through Spaulding's Value Analysis of customer products. 12 pages.

Vulcanized Fibre Engineering Data — a design reference book which comprehensively covers all the application specs of Vulcanized Fibre. 10 pages.

SPAULDING FIBRE COMPANY, INC.

360 Wheeler Street • Tonawanda, New York



DATA
18 units with 59 spindles
63-inch index table
12 double-chucking
work fixtures
with power clamping
230 parts per hour gross

Kelvinator International reduces unit costs overseas with this 59-spindle Kingsbury

Seven horizontal, 11 vertical units work on compressor part

This center column machine performs a variety of operations. It has 11 different types of tools, including an end mill, hollow mills, combination tools, and a trepanning tool.

Each work fixture holds two parts. In the first pass around the machine it is on the right side of the fixture, and in the second pass on the left. Clamping is by a spring-loaded ram, unclamping by an air cylinder.

Most of our large center column machines operate on complex automotive parts. This one shows how well this type of machine succeeds in another field. We also design and build smaller machines for simpler jobs.

But simple or complex, each Kingsbury machine has good basic design and accurate rugged construction. We feel these are essential to high production with a minimum of rejects and downtime.

Before we ship any machine, we conduct a thorough capability study to make certain it will meet print specifications and will continue to meet them at the rate specified. Each unit is tested as if it were a separate machine. You don't have to live with a Kingsbury day after day to make it work.

For more information ask our representative to call. His name is in Thomas' Register and other directories. Kingsbury Machine Tool Corp. Keene N. H.

KINGSBURY

FIRST CHUCKING

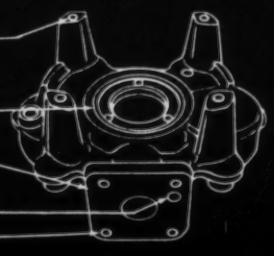
Vertical Units

DR – 9 HOLES, REAM – 2
C'SINK – 5, TAP – 4
CORE DRILL, TREPAN,
COMB. REAM, FACE, CHAM.
MILL FACE

Horizontal Units

DRILL – 2 STEPS
DRILL, C'SINK, TAP – 4

CAST IRON BLOCK FOR COMPRESSOR



SECOND CHUCKING

Vertical Units

HOLLOW MILL – 4 BOSSES
C'BORE – 3 HOLES
COMB. C'BORE & FACE – 2
DRILL, C'SINK, TAP – 2

Horizontal Units

DRILL, CORE DRILL,
BACK CHAMFER, REAM
DRILL – 2 STEPS

Inventory Management Simulator program at...

Clark Equipment... improves customer

■ **High-capacity memory.** Two IBM 305 Data Processing Systems with RAMAC keep track of 75,000 replacement and repair parts in Clark's Chicago parts warehouse. ■ **The computer has the facts.** As soon as shipments arrive at the warehouse, an operator, using this remote inquiry station near the loading platform, finds out from the computers where various items go. ■ **Customer service first.** Using this remote inquiry station in the sales department, the operator gets information from the computer while the customer is on the phone.

Clark Equipment Company has prepared a computer program called an Inventory Management Simulator. The program allows Clark management to study the possible effects of decisions on future customer service and future warehouse profitability. When management gets the computer's report, it is in a position to make new rules for the operation of its parts warehouse.

Here's what's happened since Clark put the new program into operation:... improved customer service... practically eliminated back-order problem . . . reduced the putaway time for incoming material by more than 50 per cent ... reduced emergency order shipping time by 50 per cent... enabled a physical inventory to be taken without any interruption of service to customers.

service...with less inventory

Availability highest ever. Inventory management is a complex job at Clark. Its Chicago warehouse is one of the busiest and largest in the country. Before the Simulator program was developed, the warehouse carried an inventory of 85,000 individual replacement and repair parts. Use of the program helped transfer the investment in inventory to those parts most frequently called for, giving high availability with less investment.

Management Operating System.* Clark installed two IBM 305 Data Processing Systems with RAMAC.® These computers store, update, and offer on an instant's notice information on almost every aspect of the warehouse operation including complete information on every one of the 75,000 items maintained in stock.

Now, Clark is assured of maintaining just the right level of stock for each item. The procurement formulas, developed from the Inventory Management Simulator, even recommend how large a purchase order should be placed for each item and where it should be placed.

If you have an inventory problem, why not consider a simulation program? You don't have to have your own computer. We can supply you with an Inventory Management Simulator...you can rent time on a computer. Result...improve the profitability of your warehouse operation.

**A Management Operating System uses IBM computers to make routine business decisions and take action automatically ...flags problems that need management's special attention... frees management to concentrate on the big problems and on long range planning. As a result, it gives tighter control of all business operations...and helps cut costs.*

IBM®
DATA PROCESSING

An automatic coiler forms .063 Johnson tinned music spring wire into an automobile brake cylinder spring. Because this spring will spend its life in a bath of corrosive brake fluid it needs a heavy, uniform tin plating that will not peel, crack or flake. It is a critical spring with 12½ coils, held to tight tolerances and coiled with two different end sizes. The larger end is 1.034 inches while the smaller end is .710 inch.

Mid-Continent Spring Company of Ky. says . . .

Dependable Johnson Music Spring Wire Gives Precision Springs Reliability

Dependable quality and quick service are two major reasons Johnson wire is specified in Kentucky spring plant

"After 23 years in the spring manufacturing business, I'll give you my one-word description of Johnson Steel & Wire Company's spring wire . . .

"It's DEPENDABLE."

So says L. B. Langhi, president of Mid-Continent Spring Company of Ky.

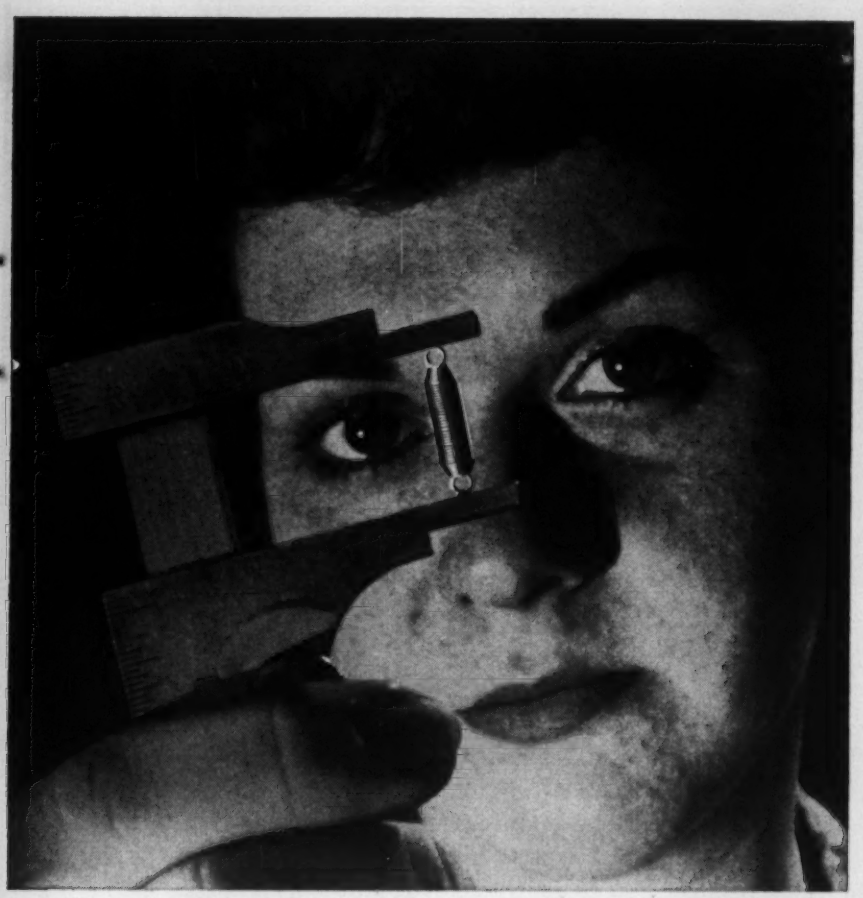
And that goes for Johnson's high carbon wire destined for springs that snap into action at the critical moment of a missile launching or simply make a baby doll wink, as Mr. Langhi explains.

Regardless of their job, it's vitally important to Mid-Continent's customers that springs function with precision. So the firm's plant at Hopkinsville, Ky., builds reliability into all its products, whether for space flights, toys, automotive and electrical parts or vending machines.

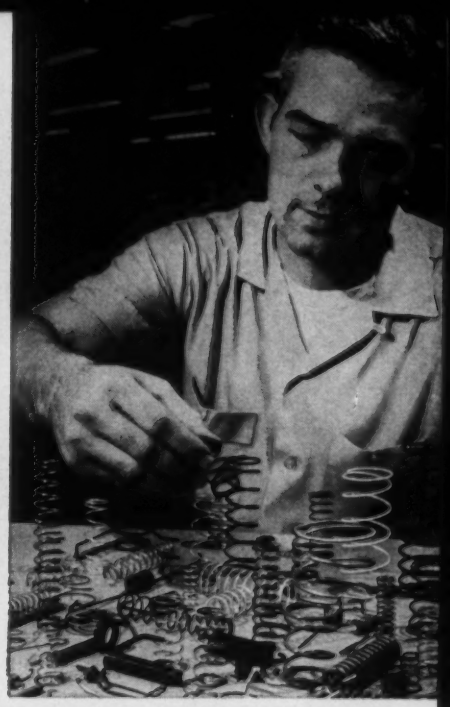
This reliability depends as much upon the raw materials of the springs —music spring wire or oil tempered spring wire—as it does upon the skills of Mid-Continent's spring makers.

Mr. Langhi said: "Because our customers depend upon our springs to give them a full measure of value, we demand and get wire from Johnson that has a uniform quality in finish, temper, size and physical properties.

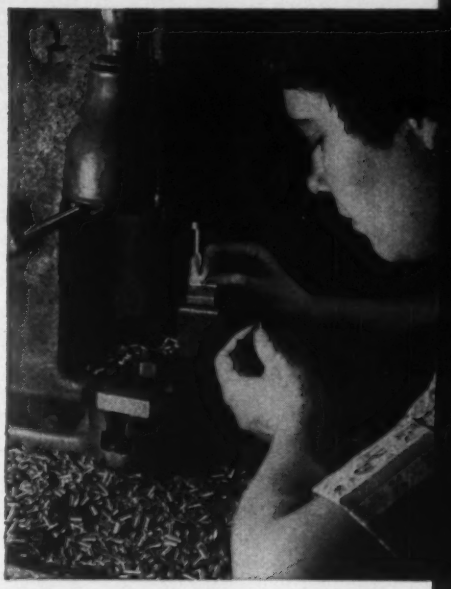
"Coatings on Johnson tin-coated



A carburetor control extension spring must be held to unvarying tolerances to insure consistent performance. This important spring is made of Johnson .010 tinned music spring wire, has an O.D. of .118 inch and measures ¾ inch outside the loops.



R. M. Worthman, purchasing agent for Mid-Continent Spring examines some of the one thousand different type springs manufactured at Mid-Continent.



This tiny vending machine extension spring is made of Johnson .013 tinned music spring wire, has .158 I.D. and 22 turns.

music spring wire are both uniform and adherent. This eliminates peeling, cracking or flaking during our coiling operation."

High physical properties, uniform cast and smooth surfaces are other important requirements since Mid-Continent springs must form within strict dimensions and carry precise work loads.

At Mid-Continent, accuracy of wire dimensions greatly affects spring coiling and performance. Close tolerances on dimensions are met consistently in fine wire specialties produced by Johnson Steel & Wire Company.

"Our production averages over a million springs per day," said R. M. Worthman, purchasing agent for Mid-Continent Spring.

"Because of this, we keep our warehouse stocked with at least 300 tons of wire. Johnson supplies us with a range of .008-inch to .207-inch music spring wire and oil tempered wire.

"Whenever our wire stock begins to deplete, we're able to call for and get fast delivery service from Johnson's mill in Worcester or from its warehouses in Chicago or Akron.

"Of the 64 different types of brake drum springs we manufacture, 90 percent of them are made of Johnson wire. That's what we think of Johnson Steel's wire."

Let Johnson start today to help you with your high carbon spring wire needs.

Just call the nearest district sales office and talk with a Johnson representative. He's ready to help you with whatever your wire and spring problems might be—right now.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Akron	Cleveland	Detroit	Los Angeles	New York	Pittsburgh
Chicago	Dayton	Houston	Philadelphia	Tulsa	Warren, Ohio

Which of these parts should be investment cast?

...*All* the parts except the milling machine collet at the top right – which is a "natural" for conventional lathe work. Even the helical impeller the men are examining is best made as an investment casting – the helix is undercut in such a way that no cutting tool could reach inside to remove the metal.

"Naturals" for investment casting are usually parts that are too intricate to be made economically by any other process, or involve alloys or quantities that make them impractical to produce by other methods. In other words, when it looks as if you might have to sacrifice a design because its complexity makes the cost prohibitive, or forego a preferred alloy because it is difficult to machine, then it's time to take a long, hard look at investment casting.

But . . . it's not always as easy as it sounds to spot the parts that are "made" for investment casting. That's where the Arwood sales engineer comes in. He knows Arwood expects him to show a customer how to get the most from the process. To help keep your cost down he may have to suggest a filleted radius here . . . or a tolerance opened up there. Then too, on occasion he may readily have to admit the part should not be investment cast at all. However, he also knows that if you just can't have the part made any other way, Arwood will go all the way down the line to have it investment cast for you.

Our five plants cast every castable metal and alloy, including magnesium and superalloys. Each has its own research, tooling, quality control and production facilities. In short, if it can be investment cast, we can investment cast it.

Machine the simple . . . cast the complex

A complete service from design through tooling, production and finish machining. Seventy-one engineering representatives from coast to coast.

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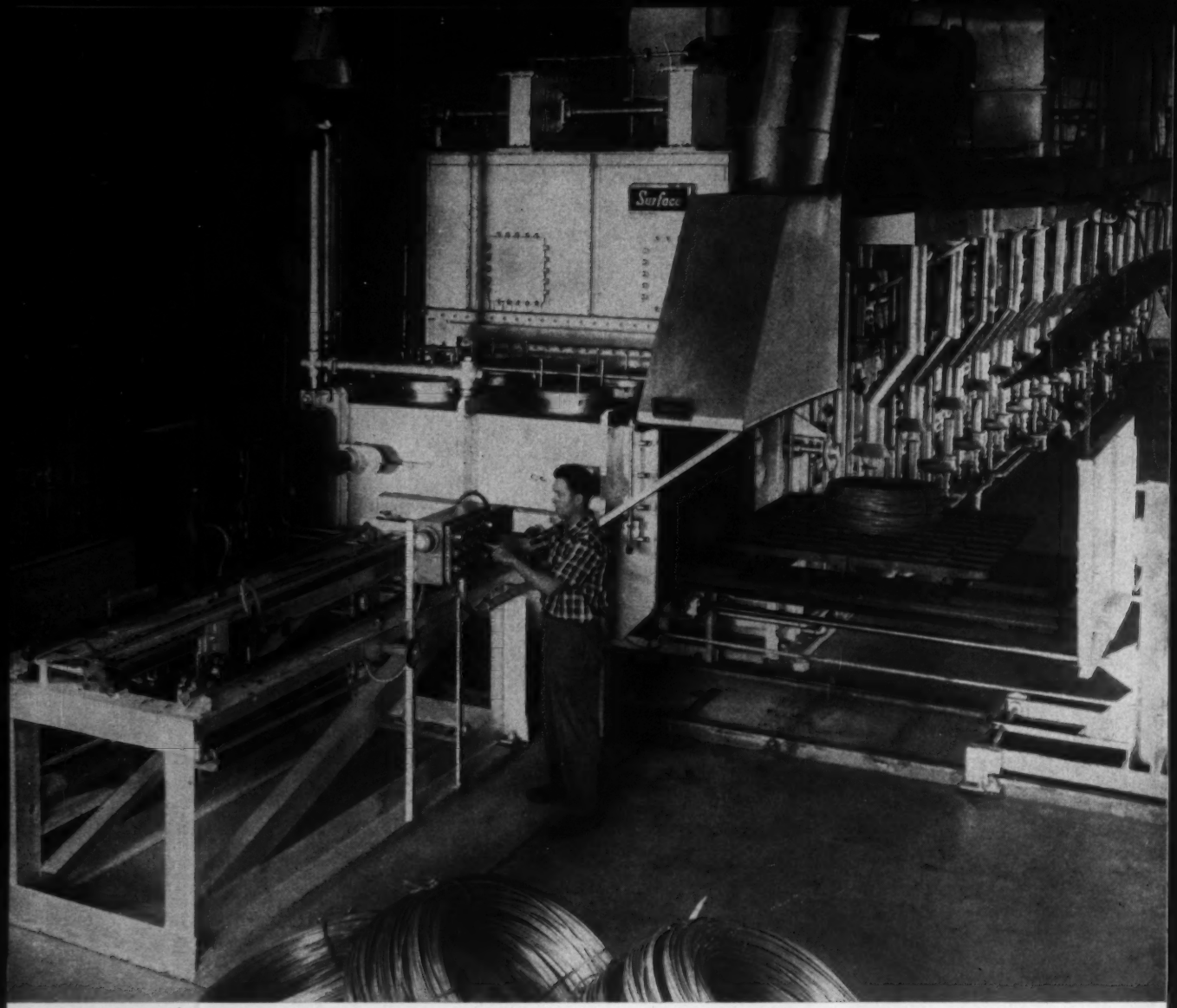

Wire inventories reduced by 80% and delivery time cut from months to days

That's the report of the Butcher and Hart Manufacturing Company of Altoona, Pennsylvania. Manufacturers of wire fasteners, Butcher and Hart installed a wire drawing line and a Surface continuous annealing furnace so they could fabricate their own wire and insure its workability for drawing and cold heading operations.

The 100 foot furnace is used to spheroidize the wire between drawings and control carbon for subsequent operations. Only two men operate the entire drawing and annealing line. The consistent and accurate system is composed of the air tight furnace, economical gas generation, and automatic control of carbon content.

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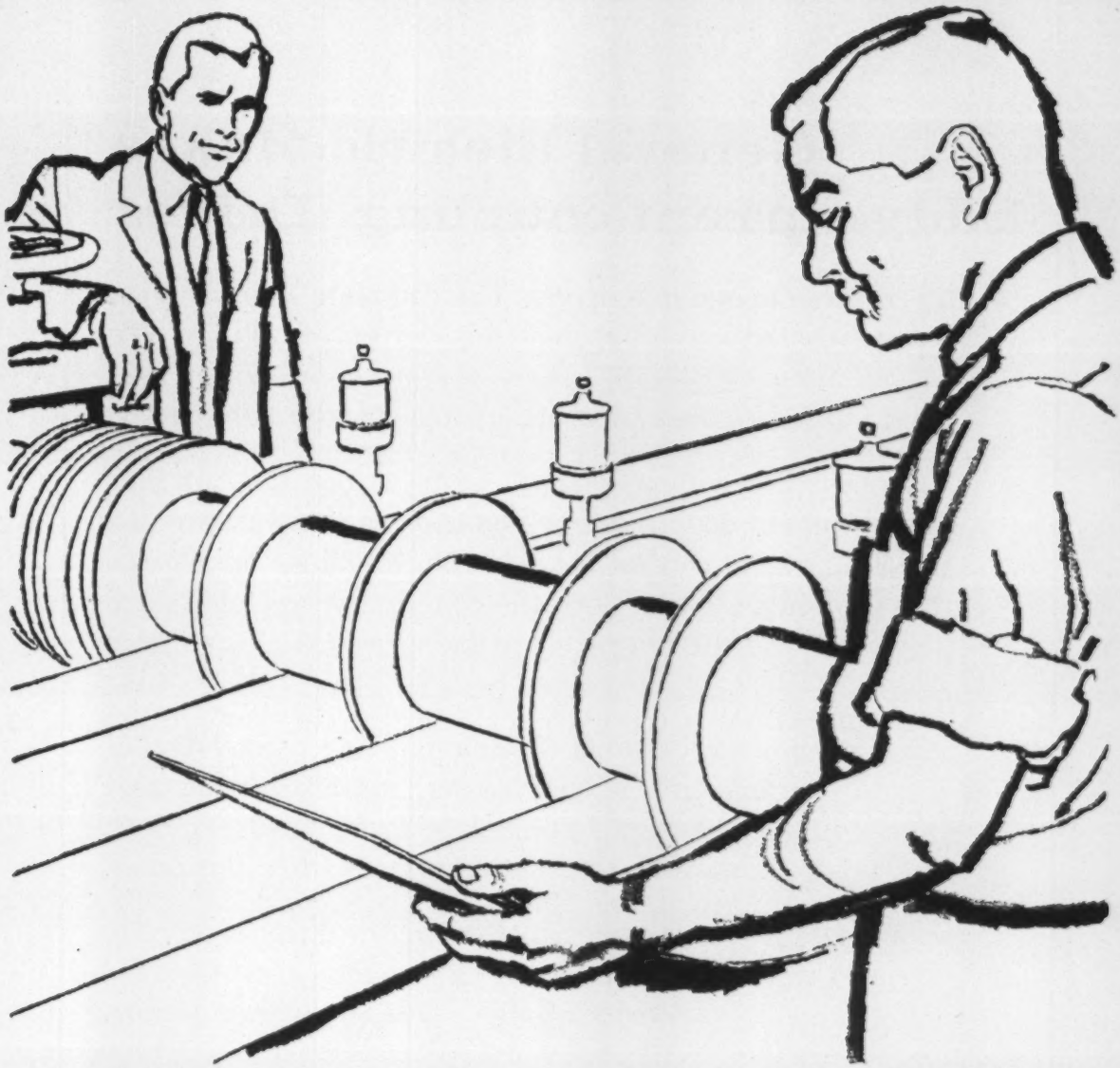

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The answer is yes when you use slitter knives from A.S.K. (American Shear Knife Company). A.S.K. Slitter Knives last longer, stand up better under the heaviest jobs, reduce maintenance and replacement costs!

Why? Because A.S.K. has devoted years of research to the selection of proper alloys, and correct techniques in heat treating, precision grinding. For slitter knives that last longer, improve your slitting operation . . . Ask A.S.K.!

FREE HANDBOOK—Want a handy reference on the installation, operation and maintenance of slitter, shear and chipper knives? A.S.K. has the answers in an 88-page manual. For free copy, write American Shear Knife Co., Homestead, Pa.

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A General Electric KINATROL drive is not just another eddy-current coupling. For instance, in the water-cooled coupling, water control is packaged. You'll see much less external piping. Furthermore, the coupling is protected from flooding—and the air gaps are dry, preventing corrosion.

KINATROL couplings are compact, field proven and dependable. General Electric has had a good deal of experience in the engineering, manufacturing, and application of packaged adjustable-speed drives. And we know how important service is to a customer.

KINATROL —a good product, with the kind of service you can depend on. Please call your nearest General Electric Sales Office for further details.

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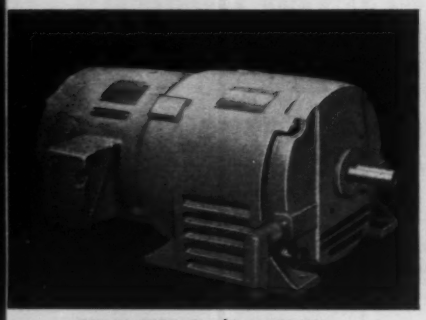
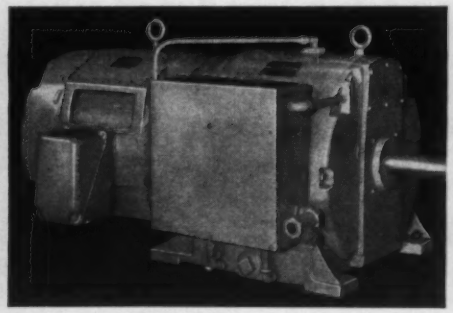
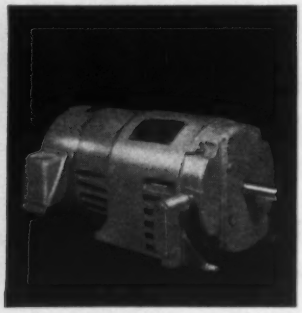


AIR COOLED, 7-1/2 to 100 HP



WATER COOLED, 25 to 150 HP



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Photomicrograph of Springkote Wire Mag. 500 x

Take a close look at Roebling Springkote* Wire

To the metallurgist's eye the grain structure revealed in this photomicrograph is a picture of high carbon wire, cold drawn from a uniformly patented condition, resulting in uniformly high tensile and long-life resiliency. It is one reason why so many upholstery spring makers prefer Springkote Wire. But it is only one reason. Springkote offers other advantages that cannot be seen until you *use* it. For example, Springkote solves stress-relieving problems, puts an end to burned-out electrical contacts and uneven heat distribution. It runs more smoothly through coiling and knotting machines and paints better. It is available in bundles up to 3000 pounds. All of which means longer runs at less cost. That's why we say, take a *close* look at Springkote Wire. For the details write to Roebling's Wire and Cold Rolled Products Division, Trenton 2, New Jersey.

*Reg. T. M.

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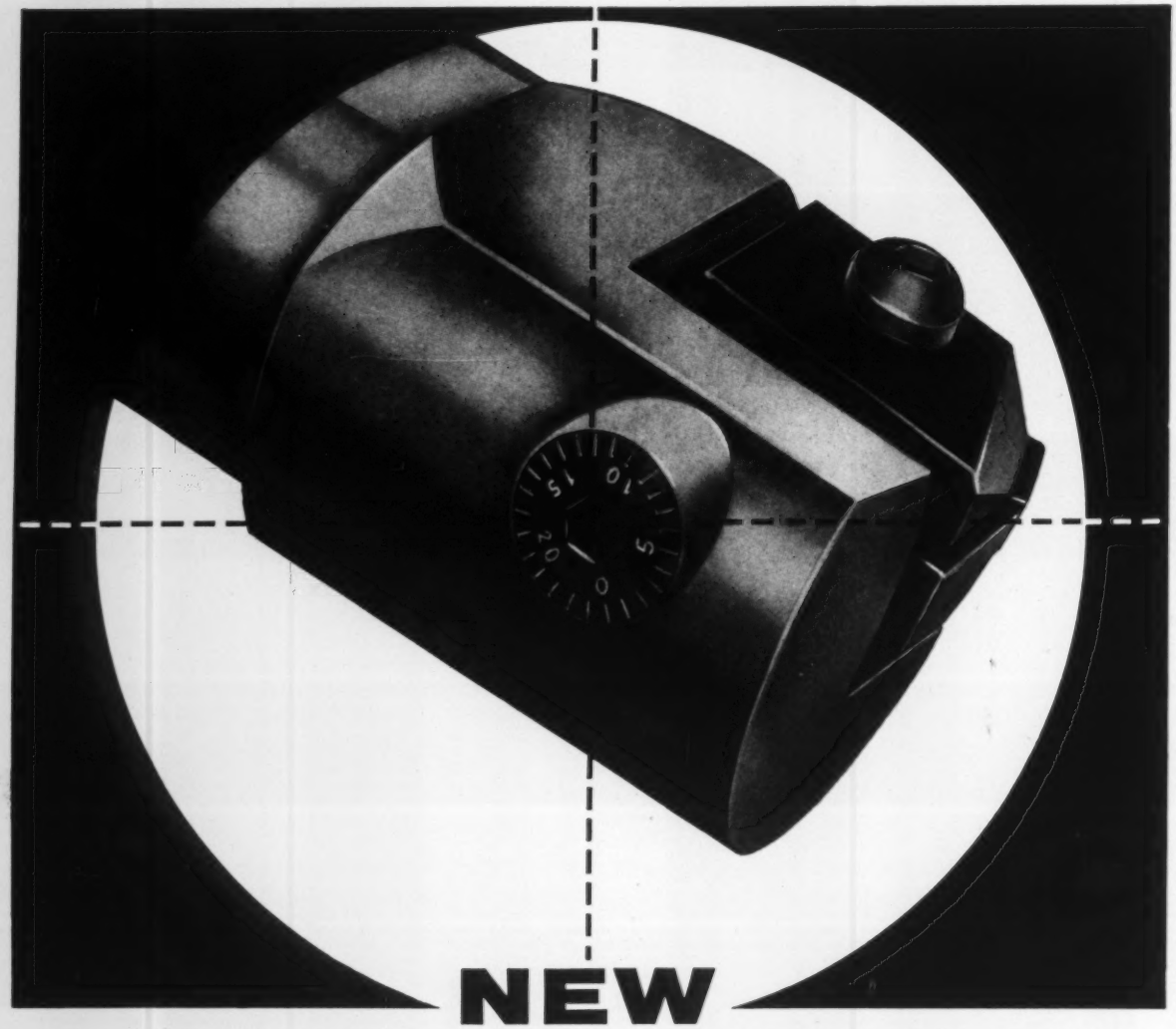

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V-R Boring Bars are micro-adjustable for controlled diameter adjustment

Here's a unique concept in boring bar design that combines a micro-adjustable feature with the economics of throw-away inserts. Fast, simple and positive diameter adjustment in increments of 0.001" save your set-up and production time — bring you greater boring accuracy. V-R carbide "throw-aways" slash tool costs — eliminate grinding, reduce tool inventory and make tool changes easy and fast. A built-in, adjustable chip breaker adapts tools to light, medium or heavy cuts.

V-R Boring Bars replace conventional boring tools, reamers, single-point tools and multiple-point boring heads on hundreds of applications. They are used on automatic or hand screw machines, boring mills, turret lathes and multiple-spindle bar machines. Micro-adjustable styles are available for small hole finishing, shallow boring and deep hole boring. Non-adjustable styles with throw-away inserts are also available.

Ask your V-R man how you can profit from V-R micro-adjustable Boring Bars or write for Catalog 6105 today.

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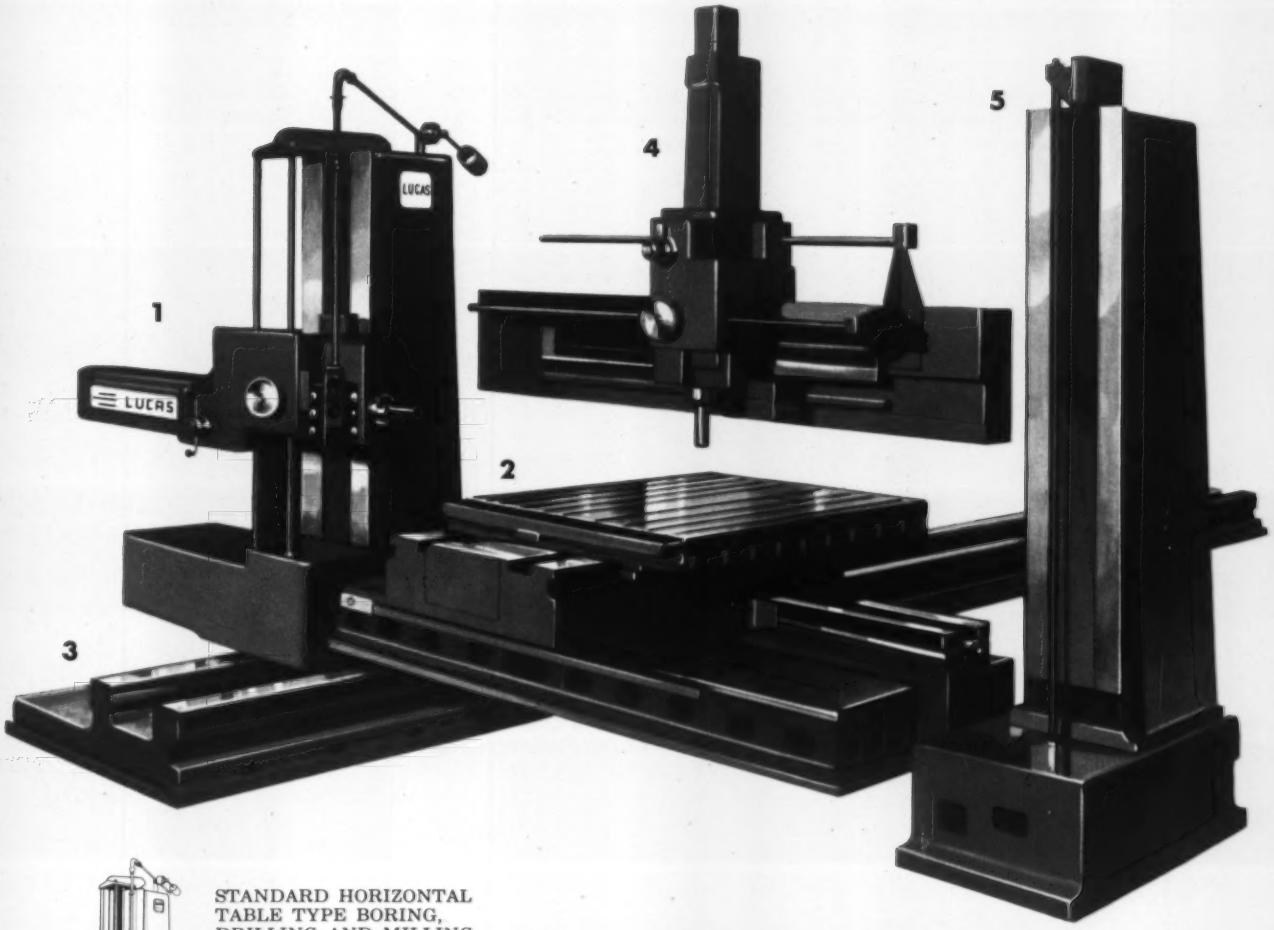
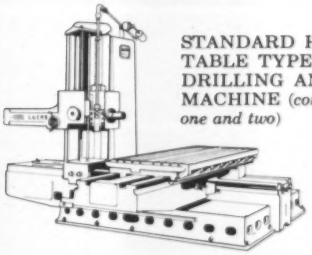
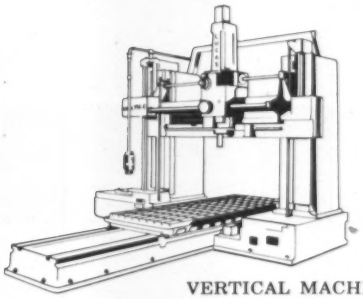
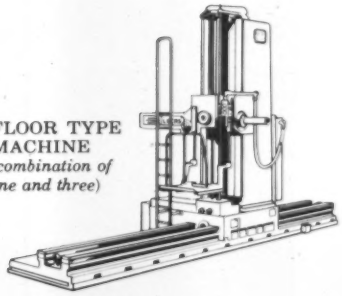




STANDARD HORIZONTAL TABLE TYPE BORING, DRILLING AND MILLING MACHINE *(combination of one and two)*



VERTICAL MACHINE *(combination of one, four and five)*



FLOOR TYPE MACHINE *(combination of one and three)*

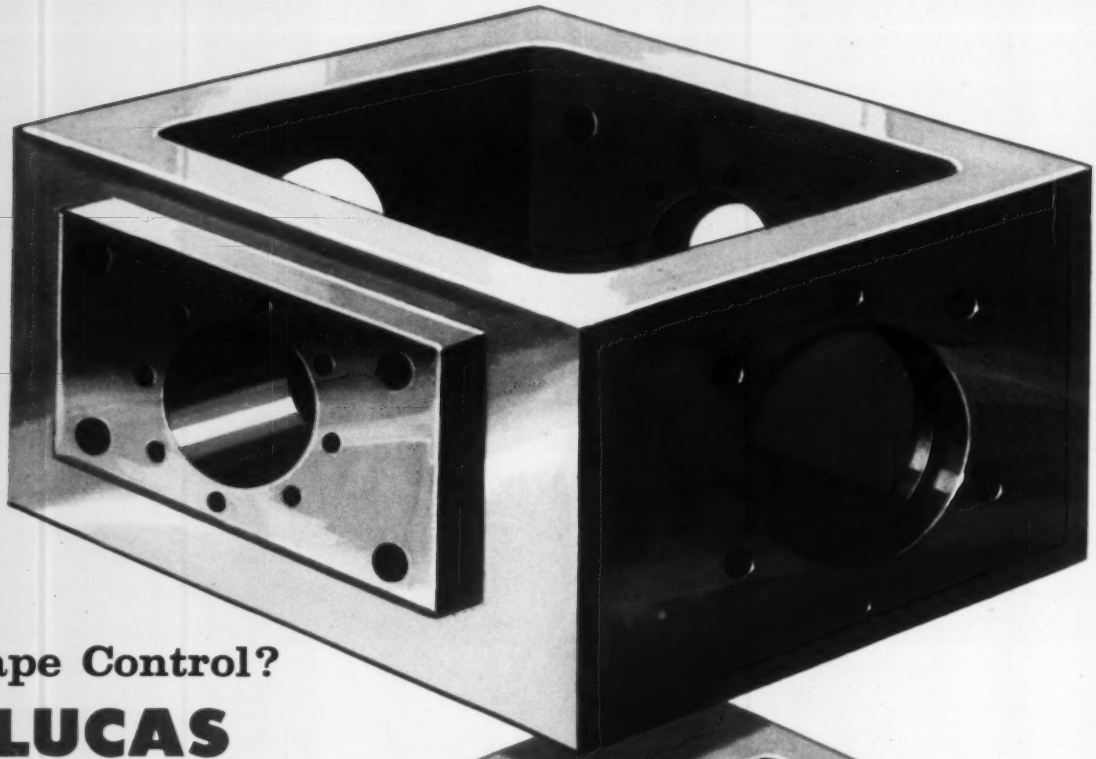
Versatility of Design?

LUCAS

Each Lucas machine—table type, floor type, or vertical—is, in effect, a composite of basic precision-made components, *with integrally cast beds*, assembled to meet your specific requirements. This progressive building-block approach to boring, drilling and milling machine design results in (1) the widest range of field-tested machine models, (2) the same high standards of performance regardless of which type machine you specify, (3) the widest possible range of work with the least number of extra gimmicks and gadgets for so-called "special" jobs. When you want the best that your machine tool dollar can buy, talk to the people who pioneered in the development of the horizontal boring, drilling and milling machine. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Ave., Cleveland, Ohio.

NOTE: In order to better define the basic components, we have shown main bed castings separated. In actuality, all bed castings are massive integrally cast units providing maximum rigidity for highest precision.

LUCAS
PRECISION



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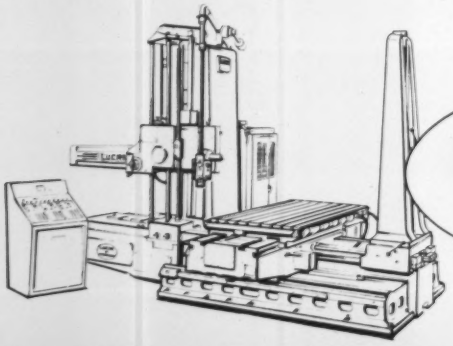
By offering the widest range of precision table type and floor type boring, drilling and milling equipment . . . by being able to perform the widest range of point-to-point and contouring work . . . by closely coordinating our efforts with the leading producers of numerical controls, Lucas is better able to provide the numerically controlled boring, drilling and milling machines you require.

No longer something to read about and think about, good tape controlled equipment is working hard in more and more plants to provide the competitive edge that spells the difference between profit and loss. A numerically controlled Lucas can help you now to cut lead time in the form of direct and indirect labor, reduce inventory, greatly reduce or eliminate jigs and fixtures, eliminate human error, etc. The list is a long one and your Lucas representative is the man who can spell it out book, chapter and verse. Review your requirements with him for a knowledgeable proposal for a numerically controlled Lucas to fit your specific needs. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio.



LUCAS
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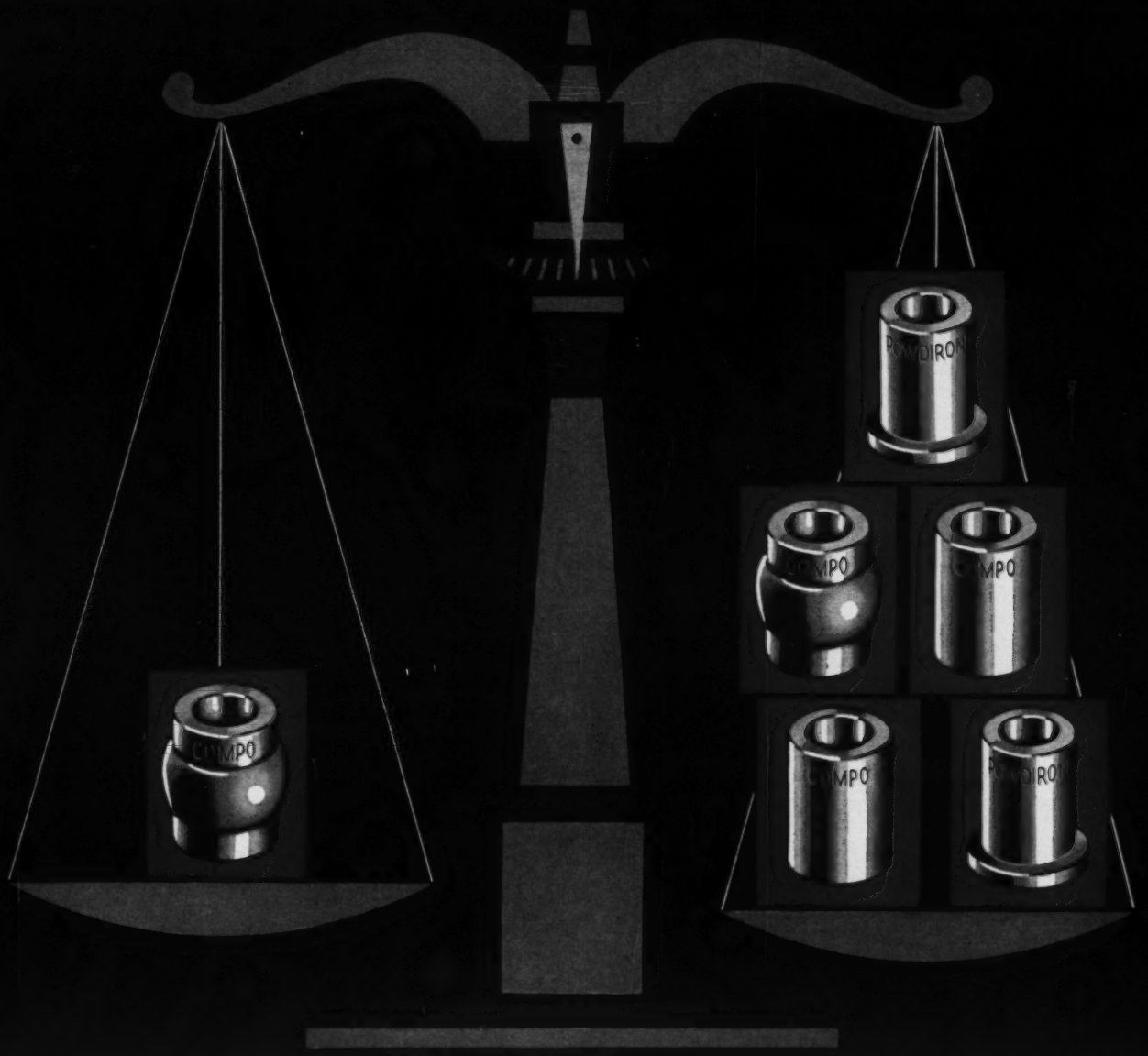

Every bearing order "weighs" the same at Bound Brook

We give the same special attention to each order . . . every step of the way, from engineering through production through shipping. Our two manufacturing plants give us the extra flexibility to meet equally well the needs of the smallest manufacturer . . . or the largest. Whatever your quantities and designs for self-lubricated iron and bronze bearings . . . you can rely on Bound Brook for "custom" service and prompt deliveries.

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THIS CINCINNATI®
shears heavy plate

Paragon Bridge & Steel Co., Novi, Mich., cuts costs as it cuts heavy plate with this Cincinnati Shear:

Operators cut production time with rapid, easy gaging and adjustment; no need for changing knife clearance to cut different thicknesses of metal.

The Cincinnati Shear also permits square shearing, notching, and slitting operations.

This machine can trim an edge to one-half the thickness of a sheet or plate. Furthermore, longer knife life is obtained from extra-size, four-edge knives.

Whether you're considering a mechanical or hydraulic shear, the broad Cincinnati line offers you maximum advantages for your plate shearing requirements. Write for your copy of a Cincinnati Shear catalog.

Shapers / Shears / Press Brakes

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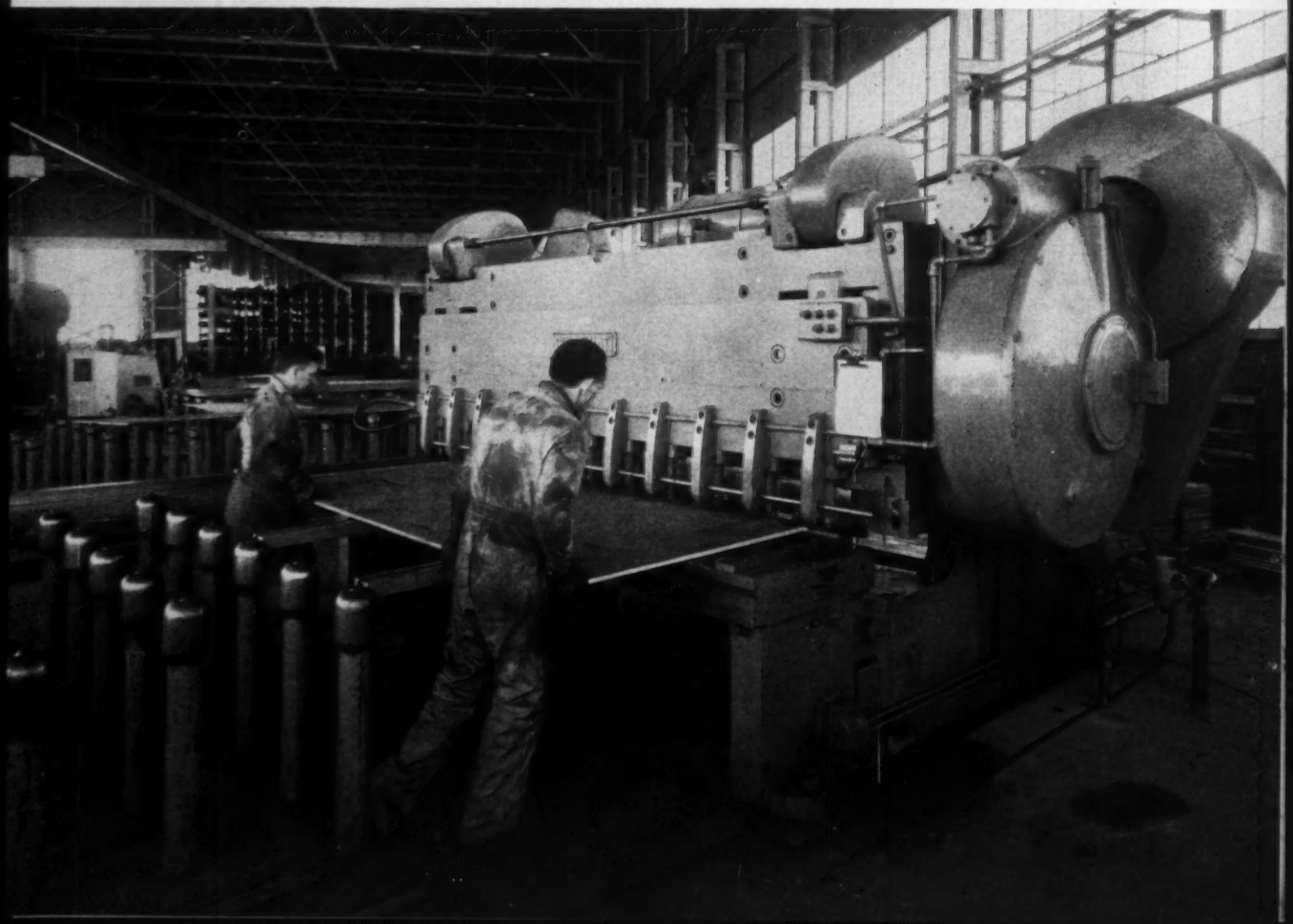


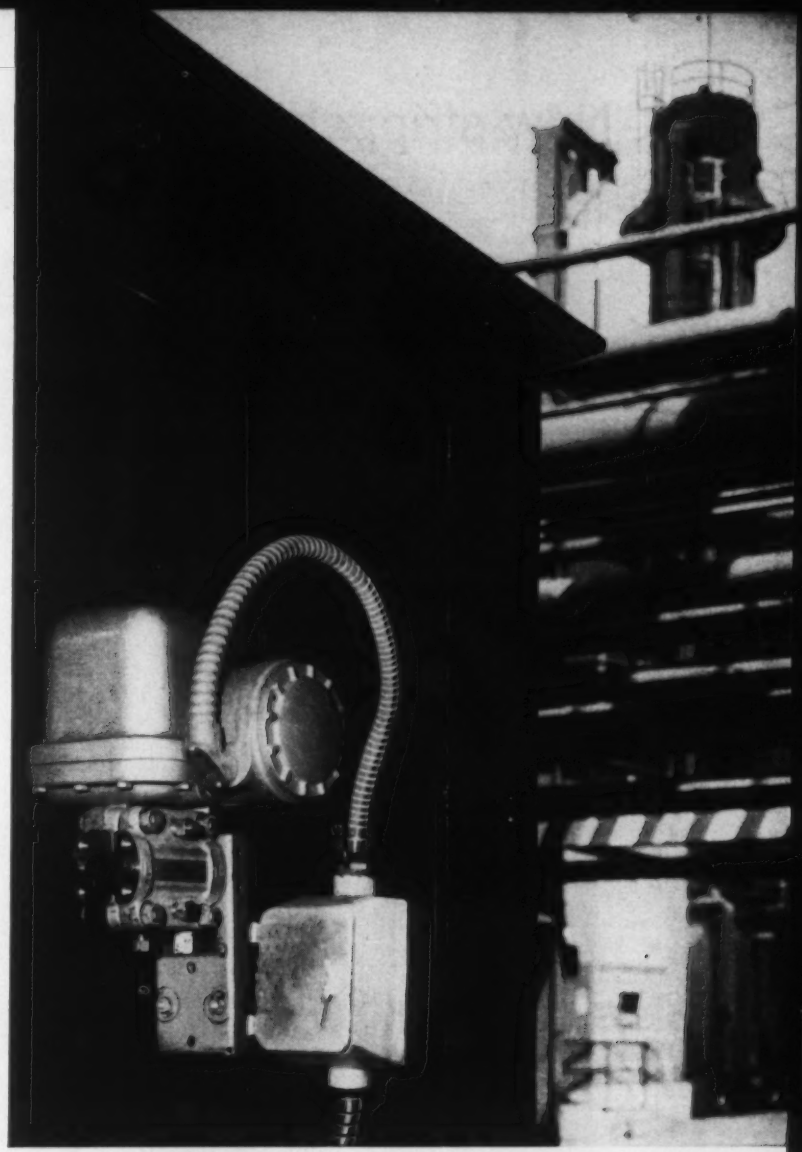
Foxboro electronics help giant steel mill "optimize" distribution of utilities

Water, gas, steam, power, oxygen — it takes all types of utilities to operate a modern steel mill. And any improvement in the efficiency of their distribution can reap a rich harvest in savings.

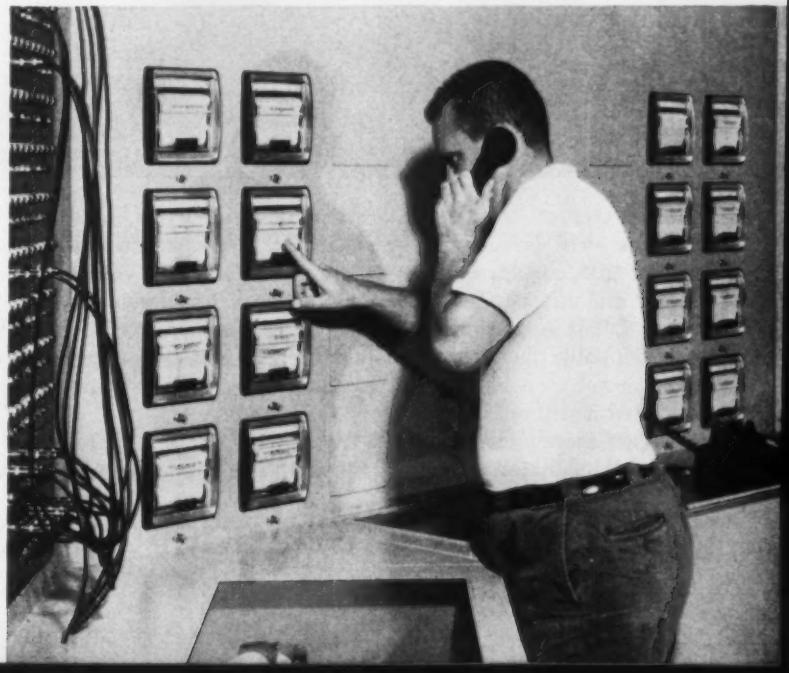
Foxboro Electronic Consotrol* instruments are helping one major producer reap just such a harvest. Dozens of Foxboro Electronic Transmitters scattered over the giant steel mill, flash pressure, level, and flow variables to a central, computer-directed, dispatching control center. As the computer figures optimum utility distribution, operators put it into effect.

Foxboro Electronic Consotrol transmitters were a natural for the system. They transmit for miles, instantaneously — over a simple pair of unshielded wires. No field power supply is required. Their 10-50 ma d-c signal serves as input for both computer and Consotrol recorders. And since components are all solid-state there is no problem of maintenance.

Foxboro Electronic Consotrol instruments cover the entire control loop. Transmitters, receivers, controllers, valve operators—everything needed for today's most advanced control techniques. Ask your Foxboro Field Engineer for complete details. Or write for Bulletin 21-10, The Foxboro Company, 8012 Neponset Avenue, Foxboro, Mass. *Reg. U. S. Pat. Off.*



▲ One of 44 Foxboro Electronic transmitters flashing data to central dispatching station. Exclusive diaphragm construction prohibits transmitter from being damaged by overrange.



Foxboro Electronic Consotrol recorders at central dispatching station, are "plugged" in only when computer typewriters show an upset. Switchboard allows 16 recorders to cover 44 different transmitting stations. ▶

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New strippable plastic film for protection of stainless steel surfaces

Protects your product quality during handling and fabrication while offering these eight distinct advantages:

- 20% cheaper than adhesive paper
- Will not bleed or discolor surface finish
- Greater resistance to scratching and abrasion
- Extremely flexible—stretches well during forming, drawing and embossing
- Can be sheared, slit, blanked or nibbled without lifting film at cut edge
- Will not embrittle during storage—retains elasticity
- Reduces wear on polished dies—eliminates lubricants in some instances
- Strips off easily—leaves no residue; final cleaning unnecessary

You get greater protection *plus* economy with the new in-fab plastic coating now being applied to MicroRold® stainless steel sheet, cut strip, and coiled sheet and strip. The semi-transparent protective film is 20% lower in cost than regular adhesive paper and offers more versatility in fabrication. The protective film is applied at our mill on customer order only, and is available on stainless steel in gages from .018″ to .050″ in widths up to 42″. It is guaranteed to strip off in one piece by loosening with fingernail at any corner.

Strippable plastic protection is intended as a safeguard only during ordinary handling, storage and fabrication—*not* as a barrier for weather, water damage, undue abrasion, impact or foreign substance. Once removed it will not adhere again.

Want more information or a test sample? Write to Product Development Dept., Washington Steel Corporation, 12-L Woodland Ave., Washington, Pa.

WASHINGTON STEEL CORPORATION

Woodland Avenue
Washington, Pa.

FOREIGN STEELMAKERS are making big strides in production speed and quality improvement. This was brought out at a recent U. of Pittsburgh business conference. R. W. Simon, vice president, metallurgy, U. S. Steel Corp., reports foreign plants are getting good surface quality and adequate drawing properties in deep drawing sheet. And they are catching U. S. mills in uniformity. D. R. Loughrey, Jones & Laughlin open hearth consultant, said speed is now the No. 1 target of foreign mills.

NEW CAR SALES in October-November-December may reach an all-time high for a final quarter. Combined domestic and foreign car sales are expected to top by 40,000 units the record 1.7 million units sold in the last three months of 1955.

AN "AMAZING RESISTANCE TO HIGH STOCK LEVELS" is indicated of buyers in the November survey of the National Assn. of Purchasing Agents. Almost 80 pct of buyers surveyed expect to maintain stocks at present or lower levels at least until the end of the year.

BETTER REPORTS TO MANAGEMENT BY MARKETING MEN are urged by W. F. Hastrom, vice president, marketing, Autonetics Div. of North American Aviation, Inc. "It is not the manager's job to understand your function", he says. "You are the expert, and if it is too painful to use your services, he'll achieve his objectives in another way."

INDUSTRIAL HEATING EQUIPMENT ORDERS took a sharp turn for the better in October. Net domestic orders totaled $5.4 million. This is an increase of 38 pct from September. And the Industrial Heating Equipment Assn. reports foreign orders at a "high level."

THE 1962 CARS WILL TAKE ALMOST AS MUCH STEEL per unit as did the 1955 models, says Walter Moore, director of commercial research, Jones & Laughlin Steel Corp. Even with 30 to 40 pct compacts, new models require 1.68 tons of steel each. In 1955, steel use was 1.7 tons per car. Thinner tinplate is having much more impact on steel tonnage than compact cars, he says.

CONSTRUCTION IS DUE FOR A GOOD YEAR in 1962, predicts E. W. Magee, Jr., a partner of MacKay-Shields Associates, consultants. He says gains in all major areas of the market should bring total spending to about $61 billion. This is 7 pct over 1961.

In service 40 years... never overhauled!

After *40 years of continuous service* at Alcoa's New Kensington, Pennsylvania plant, this rugged Cleveland Worm Gear Speed Reducer was slated for an overhaul.

As this unit—which continuously drives a foil mill—had never been opened before, a thorough, painstaking inspection was made by Cleveland service engineers. They found the reducer required *only* a new worm radial bearing to put it in top notch operating shape. Even the gear's working face was in almost factory-new condition—after 40 years of rugged, heavy-duty operation!

As our engineers left the plant, Alcoa personnel remarked, "Well, we'll see you again in another 40 years."

We are extremely proud of this experience at New Kensington. It serves to point up our belief that building product quality and performance in Cleveland Reducers is still the main reason we are in this business. We know from experience that industry welcomes quality products—and we will *continue* to produce them.

* Today, some capital goods producers seem to be guided by the philosophy that in this age of rapid change in manufacturing methods and equipment, the resulting high rate of obsolescence does not justify the costs entailed in building long operating life into a product. This is not true of Cleveland —and never will be.

Why not talk to your Cleveland Representative and get the latest information on Increased HP Worm Gear Speed Reducers. Or write for your free copy of our latest illustrated literature—it contains the story of today's finest reducers.

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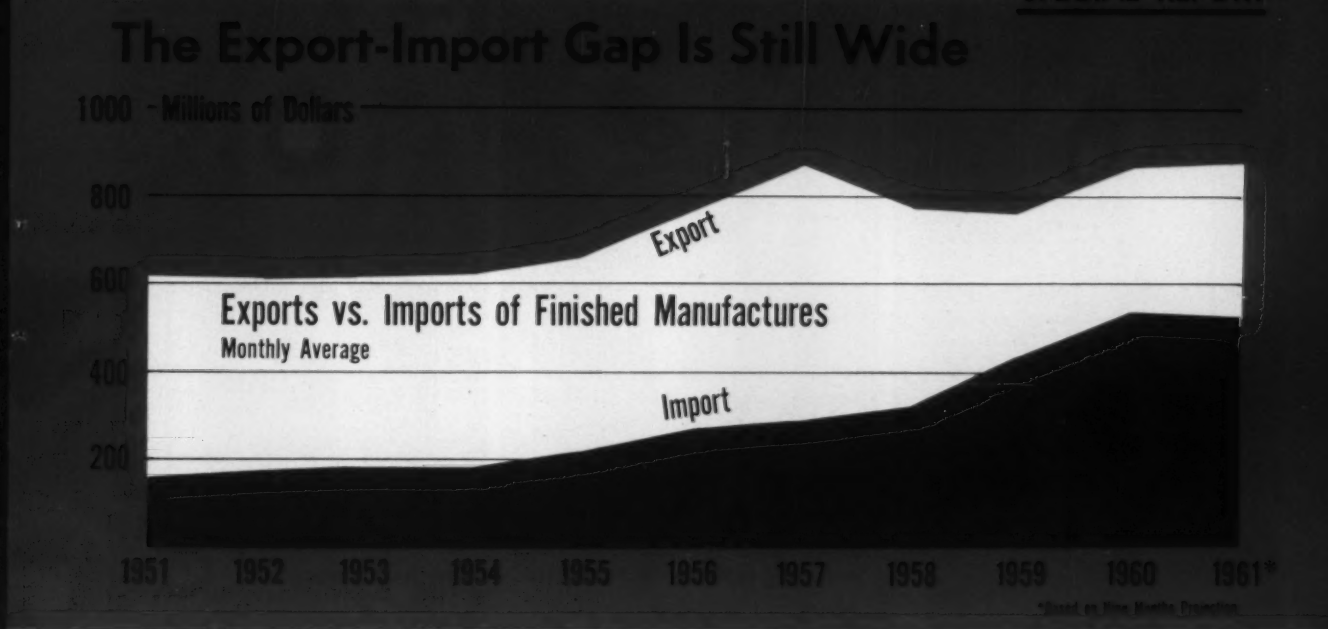


Should U. S. Liberalize Trade? Congress Braces for Battle

The Administration plans an all-out push for its new freer trade plan.

But the protectionists are also preparing their attack.
By R. W. Crosby

■ The Kennedy Administration faces its toughest battle in Congress next session. The battle will rage over radical changes the Administration seeks in U. S. foreign trade policy.

And the outcome of the battle will have a serious impact on hundreds of U. S. companies.

When Congress opens Jan. 10, the battle lines will be formed. Says one legislator who supports the President, "Congress will be split asunder by the trade fight." An opponent of the new trade policies, influential Sen. Barry Goldwater, R., Ariz., says the foreign trade program will be "the overshadowing issue before the next session of Congress."

Wary of Outcome—Both proponents and opponents of a broad free-trade program sought by the Administration are wary of the outcome.

Under Secretary of State George W. Ball, number two man in the State Dept. and leader of the President's trade battle, told The Iron Age, "I'm confident we'll get the support of both Congress and industry."

But Mr. Ball's confidence isn't as sure as it sounds. He admits getting that support will be difficult.

Two Problems—The foreign trade battle revolves around two immediate problems—expiration of the U. S. Reciprocal Trade Agreement and the expansion of the European Common Market.

The Reciprocal Trade Act, first passed in 1934, will expire on June 30. It already has been renewed eleven times and its usefulness is considered at an end. Unless something is done in Congress before the act expires, the President will be left without bargaining power to open up foreign markets to American exports.

The six-nation Common Market —with numerous associated nations—is moving toward complete abolition of tariffs among its members. Now Great Britain is seeking to join the union. And five or six other nations are applying for membership. Abolition of Common Market tariffs would hinder heavily-taxed U. S. exports.

President's Plan—President Kennedy has decided to make an urgent appeal to Congress for more and broader trade powers. The President's program would enable him to negotiate trade agreements with

UNDER SECRETARY BALL: "I'm confident we'll get the support of Congress and industry."

"To return to 'Fortress America' would mean abdication of U. S. leadership in the world."

"By and large, business reaction to the Administration's proposals has been encouraging."

foreign countries on an "across-the-board" basis. The present Reciprocal Trade Act allows only negotiation for tariff cuts "item-by-item." The new plan would allow him to make deep tariff cuts on whole categories of products.

The program also calls for financial help for companies and workers injured by import competition in the wake of tariff cuts. But these would be in the hands of the White House—not spelled out in law as they are now.

This program would mean the end of the "peril points" for setting tariff floors. It also would weaken the "escape clause" which permits ending of trade agreements because of import injury. Both devices are now spelled out in law.

Competing Powers—Under Secretary of State Ball told the Iron Age the President must have tariff-cutting powers or else American industry can be shut out of the European market. He added:

"Because of the Common Market, and the United Kingdom's moves to join it, the U. S. is faced with the development of a market as big as its own.

"What may emerge is the concentration of 90 pct of the total free world exports of industrial products in two great Common Markets—the Common Market of Europe, consisting of an undetermined number of states, and the Common Market of the United States, consisting of 50 states. Both these markets will be surrounded by a common external tariff.

Trading Partner—"For the U. S., the European market represents a great trading partner. We must give the President the powers it takes to negotiate with this other market."

The President believes that unless steps are taken, U. S. exports will find it hard to enter the Common Market. Thus, the $5 billion a year balance of trade advantage of the U. S. would be reduced.

The Administration also contends that wide-ranging tariff cuts would help unite the free world in a cold war economic offensive.

Industry Support—Congress, of course, holds the key to the program's success or failure. But it is the program's effect on industry that will decide how many congressmen vote on it. Most will listen to the general free-trade arguments. But it's another story with industries in their home districts which would be hurt by imports.

Under Secretary Ball summed up the Administration's sales pitch: "The American business community can take one of two positions on the new trade policy," he said.

Two Choices—"Businessmen can say 'we have priced ourselves out of world markets. Our costs are too high to meet foreign competition,' and with these overtones of defeatism they can suggest we protect our own markets. They can retreat into 'Fortress America.' But to retreat into 'Fortress America' would mean abdication of U. S. political leadership in the world. And we cannot accept that.

"The second position is for businessmen to prepare themselves to accept competition. This will mean price and wage stability consistent with free enterprise. And it will mean businessmen will have to repudiate protectionism.

"I have enough confidence in American industry to believe it will accept the latter position. By and large business reaction to the Administration's proposals has been encouraging. But, of course, all the precincts haven't been heard from.

Government Help—"At the same time, the government must recognize neither industry nor labor can be asked to make an adjustment which

might idle manpower or equipment. Therefore, the government must offer assistance to industry."

Mr. Ball's last point—that the government aid industry—is a key part of the Administration program. Through safeguards in the trade program, the Administration hopes to win industry and Congress to its side.

Secretary of Commerce Luther Hodges, while backing the program, says, "I think that we would be very foolish if we embarked on any program which disregarded industries in this country. There will be a very definite program of assistance which would presumably take care of people who are involved in loss of jobs or loss of business."

Exceptions Noted—Mr. Ball is quick to point out that the U. S. cannot protect every American industry against "the adjustments required by competition." However, he said, "there are always a limited number of exceptional cases which demand exceptional treatment.

Mr. Ball lists as possible Federal aid to American industry hurt by freer trade policy: 1. Quicker amortization of obsolescent machinery.

MEANY: Organized labor should not be "blinded by the dictates of self-interest."

2. Tax credits for modernization. 3. Retraining and relocating labor. All three aids have been embodied in President Kennedy's program for the coming year.

Want More—But safeguards may have to go further to please Congress. A report by the Joint Economic Committee of Congress suggests Federal aid to individual business firms hurt by imports.

Sen. Goldwater says he will oppose the President's program "until there are adequate safeguards to American industries." He adds, "We have to protect our basic industries."

Rep. John H. Dent, D., Pa., perhaps the loudest congressional opponent of freer trade, wants more safeguards.

New Opponents — The demands for protection are not the old line protectionist group. Rep. Dent, for instance, turned away from free trade when industry in his district started suffering from imports.

Southern Democrats, for instance, are swinging from traditional free-trade feelings as the South industrializes and foreign invasion of its markets grows. Northern Democrats, too, have felt the bite of foreign competition. It will be hard to convince them freer trade is the answer.

Republicans also will split on the trade issue because complaints from back home are mounting.

Other Foes—Opponents outside of Congress have loudly criticized the program. The Nation - Wide Committee on Import-Export Policy is the most vocal. Labor, particularly the rank and file, also complains against growing sales of foreign products in domestic markets.

But despite this opposition, strong defenders are in Congress.

Senate Democratic leader Mike Mansfield, a member of the Foreign Relations Committee, says he will "support the President all the way." Rep. Henry Reuss, D., Wis., may be the free-traders' answer to Rep. Dent.

Business Supporters—Outside of Congress, President Kennedy has gathered widespread support. A

GOLDWATER: "Until there are adequate safeguards, we have to protect our basic industries."

group of businessmen, the Committee for a National Trade Policy, is forming the nucleus of a drive to get industry support.

Members of the General Agreement on Tariffs and Trade (GATT), who negotiate tariffs with the U. S., give their support to an "across-the-board" type of bargaining.

One of the most vocal supporters is Sec. of Labor Arthur Goldberg, who says present policies are obsolete. He has been talking up support among union leaders and has gotten it from some top men.

Meany's View—AFL-CIO President George Meany says organized labor should support more liberal trade policies for its own good and not be blinded by "the dictates of immediate self-interest."

The President's cabinet backs him all the way. Even two Eisenhower Administration diplomats, former Secretary of State Christian Herter and Under Secretary of State William Clayton, have lent their support.

Foundry Profit Down; Pinch On

Closings Are at a Record High as the Squeeze Tightens

Customers trying to keep prices down balk at a premium for quality.

Some foundries are answering the dilemma by selling selectively; others hope buyers realize the problem.

By T. M. Rohan

■ "You may say that I am a very bitter man," a leading Ohio foundryman said last week.

"We have just received another letter from one of our largest customers that we must immediately reduce our prices to them by 5 pct. Why they think they can send a letter like that to us, I don't know. But we have been getting about one a month now.

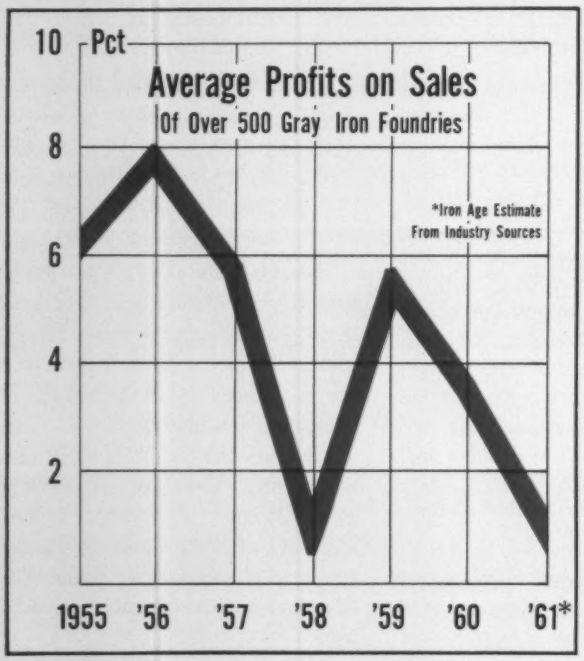
"Our customers are squeezing us harder now than any time since the war. 1958 was a breeze compared to this. We're turning jobs down every day because we'd lose money on them, even with our best new equipment and methods."

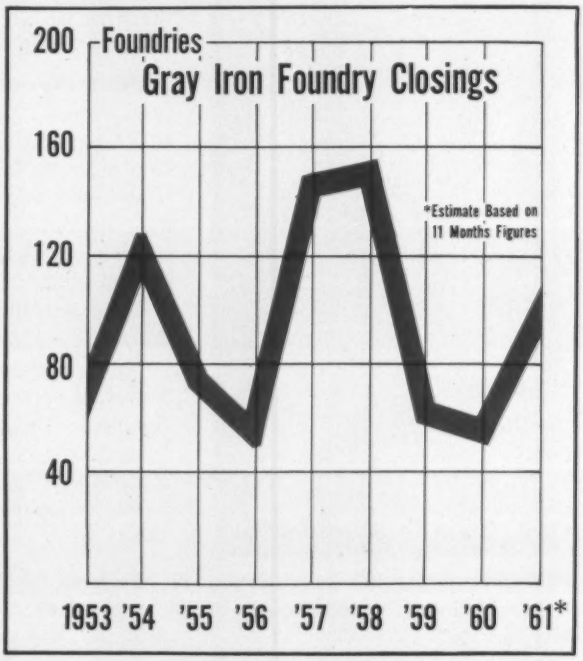
Profits Down—The speaker was telling in his own words a trend that is rocking the foundry industry on its heels. Foundry closings this year are running at the highest level since the recent record year of 1958. But the impact this time is possibly even greater because now some of the biggest and best-heeled are going under. Others see the handwriting on the wall and are closing their doors voluntarily. Foundry industry profits on sales this year will barely clear 1 pct before taxes, the worst since the 0.8 pct of 1958 and contrasting with a recent peak of 7.9 pct in 1956. The glimmers of hope are there, but few and far between.

The root of the problem is that while the foundry industry has improved its products tremendously in the last 10 years, customers will not pay any premium for the better quality. Another strong factor is high labor costs and recalcitrant unions. Some users have driven undercapitalized foundries to the wall, to find other foundries would take their business only at increased prices. Some users have had to hire consultants to find a willing qualified foundry to take on the business.

Foundries Closing—"Big progressive foundries which have closed in the last few months certainly have had no shortage of management talent, engineering and marketing ability, facilities, or craftsmanship," says Don Workman, executive vice president of Gray Iron Founders' Society, Inc. (GIFS), Cleveland. "Large firms like Superior Foundry, Fulton Foundry, Peerless, Sorbo-Cast and Straight-Line Foundry can

A Time of Attrition for Foundries





turn out the best quality. But customers are not always ready to pay for the finer surface, clealiness and better quality they demand.

"We are now going through a big period of attrition. Some of it is due to foundries not using proper costing, marketing and other advanced techniques. The survivors, however, should prove stronger than before."

A New Record—Foundry closings this year as counted unofficially by the GIFS numbered 90 through last week. For 1961, closings will probably equal the previous two years combined. Recent record years were 151 in the 1958 recession and 147 in 1957. There are now about 1950 gray iron foundries in the U. S. compared to 3000 in 1947. But tonnage shipped is relatively constant at 11 million estimated for this year against 12.7 million in 1957.

Yet the squeeze is painful to behold. And, of course, thousands of workers go unemployed. One of the larger foundries which closed recently went to its half dozen biggest customers personally to attempt to show its justification for a 5 pct increase. In all cases, the foundry was turned down cold. So directors simply voted to close the doors rather than try to compete in a losing cause.

Quality vs Price—"Price competition is at all-time high right now and the price cutting is severe," says Peter R. Rentschler, vice president of Hamilton Foundries, Hamilton, O., a long time quality producer.

"We are being squeezed by castings users for higher quality at the same old price. Some users are bypassing us to get lower quality castings elsewhere and just looking at the price. We end up being unable to get a better price for an improved product. So we are expected to give away the benefits. You can't do that very long.

"We feel that most of the pressure is from top management trying to cut costs, because they, too, are in a competitive bind," Mr. Rentschler says. "They lean on the purchasing men to lean on the foundries as the most likely spot for a reduction and talking quality gets nowhere. We are expected to throw in items like extra finishing. If we don't there are constant complaints, but they won't pay for the cleaning," Mr. Rentschler says.

One Answer—An Indiana foundry, too, has become far more selective in its selling, turns down many jobs and also has improved its internal operations.

"We are declining to quote now on some classes of work that would have looked good to us six months ago," says Joseph Shellabarger, sales vice president of Dalton Foundries, Inc., Warsaw, Ind. "We have become more firm in our prices and more selective in our selling effort. The squeeze got tough in 1960 and reached its peak in the first half of 1961. But we haven't received any requests for across-the-board cuts since March this year.

"Before shouting wolf to the customer, however, we have been looking to see what could be done to improve our margins through better methods," says Mr. Shellabarger. "On two construction parts we were running 9.5 pct and 10.5 pct below standard margins. Before going to the customer for a price adjustment, everybody in our outfit gave this job a good hard look. As a result through a process change, we increased our molding production on them by 60 pct and got our margins back up to normal, even after reducing the price to the customer. His savings will pay for the new pattern equipment in one year."

Some Optimism—There are a few other glimmers of hope.

"Within the last 60 days we have received indications that certain smart buyers have decided—possibly because of the recent rash of foundry closings—that you can't get blood out of a turnip," says Mr. Shellabarger. "Those buyers are becoming increasingly concerned about foundry margins. We, in turn, are becoming more concerned with what the users' end price must be, rather than just our costs."

Despite the overall price squeeze, Mr. Rentschler, too, feels that some buyers are beginning to realize there's more to buying castings than just price and specifications.

Foundries Still Big Business

A recent foundry industry analysis by the Federal Reserve Bank of Cleveland indicates that the ages-old foundry business is still a giant to be reckoned with.

The report indicated there are nearly 4000 different kinds of castings made for use in 500 different industries. Value added by manufacture based on the 1958 census was $1.8 billion. This puts it in the same class with metalworking machinery at $1.9 billion, pharmaceuticals, and canned and frozen food.

The $1.9 billion is a sixth of the total value added by the entire primary metal industries. Employment was over 246,000 or a fifth of the total for the primary metal industry. Three-quarters of the production is from independent foundries, the remainder from "captives" integrated with other manufacturing items.

Gray iron foundries are the largest segment, responsible for 46 pct of the value added by manufacture. Non-ferrous types are second at 26 pct, steel at 22 pct and malleable iron at 7 pct. Employment ratios are also about the same.

Ohio, Michigan and Pennsylvania rank one, two, and three in foundry activity nationally and together account for two-fifths of total for the U. S. Ohio in 1958 had $279 million foundry value added by manufacture or 16 pct of the U. S. total.

How Does Volume Affect Profits?

Steel Producers Hope to Find the Answer in 1962

They also want to see whether recovery cycles will have lower peaks than before.

Estimates on both counts remain conservative.
By G. J. McManus

■ Steel mills are looking for 1962 to answer some big questions about earnings and volume.

After four flat years, the mills may now get a chance to see if profits increase more rapidly than in the past with rising volume. They may also learn in 1962 if recovery cycles are going to have lower peaks than in the past.

On both counts, current thinking is conservative. Most forecasts call for steel production of 110 million tons to 115 million tons. There are some lower estimates but a gain of 10 to 15 pct is fairly standard.

Earnings Rise — Steel earnings are seen moving up much more sharply. Three major mills are talking about a profit boost of 40 pct or better. At the recent Pitt Conference on Business Prospects, a comparable dollar figure was named by P. E. Albrecht, steel specialist for Merrill Lynch, Pierce, Fenner and Smith, Inc.

Mr. Albrecht sees industry profits of $950 million for 1962 and adds that this "can be considered a minimum if the tonnage estimates (110 million) are close." His prediction assumes there will be no price increase next year and that "wage increases can be held within the bounds of productivity."

If all these numbers stand up, next year will be the best for steel profits since 1957 and the fourth best in the history of the industry. This sounds like an impressive showing after three years of rising wages and stable prices. Yet there are some who hope the industry can do a lot better in 1962.

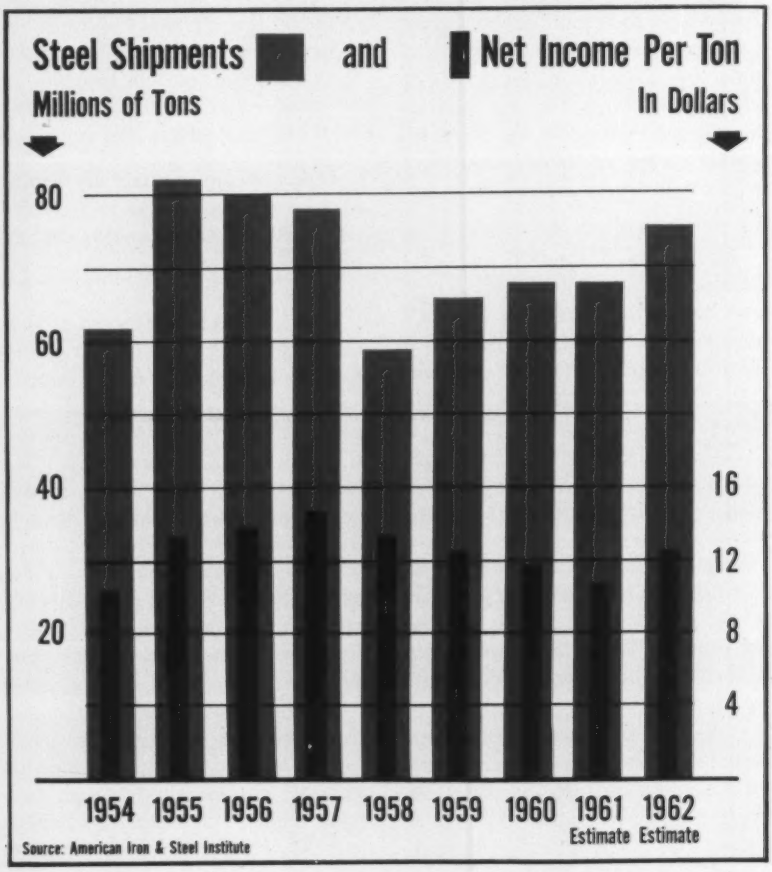
New Profit Trend—The reason is that a new profit trend has developed over the past three years. In this period, break even points have been rising and profit margins have been sliding. Prior to 1958, it was generally believed the mills were reducing break even points and increasing profit margins at all levels.

The change of direction shows up clearly in recent statements. In 1958, the companies reporting steel profits shipped 59 million tons and earned $13.32 on each ton. In 1960, there was a margin of $11.80 on 68 million tons. With roughly the same volume this year, unit profit is expected to dip under $11 a ton.

According to a mill economist, the industry could earn about 6 pct on sales in the 1955-57 period while operating between 40 and 50 pct of capacity. At the same levels now, says this source, return on sales is about 4.5 pct.

Steady Decline—As these figures indicate, the industry's earning

Income Rises With Shipments



power at low levels has been declining steadily. Some causes are noted by Mr. Albrecht: Steel employment costs rose from about $64 a ton in the 1955-57 period to $80 a ton in the 1958-60 period. During this span, material cost went up $5 a ton; depreciation moved up $1.10 a ton. Interest costs moved up $33 million.

However, there were hopes that modernization programs, while not able to maintain margins at low levels, had created higher earning power at upper levels. According to this line, the recent profit shrinkage has indicated, in part, that steel margins now move up and down more drastically with volume.

" . . . Volume is the single most important determinant of steel industry profits," says Mr. Albrecht.

Another authority points out that steel automation is reaching the point in some operations where machines are replacing machines. Further modernization tends to raise break even points and requires a relatively high volume before there is any cost reduction.

"You don't reduce costs; you only dilute them," says a rolling mill man. At the moment, the general thinking is that costs will not be diluted enough next year to restore old profit margins. Earnings of $950 million come to $12.50 a ton, says Mr. Albrecht, when spread over the shipments next year.

Easily Improved—This would be up from 1961 but would be $2 a ton less than the average from 1955 through 1957. Mr. Albrecht feels $12.50 is a minimum that could easily be improved. A 5 pct gain would bring profits close to the all-time peak of $1.13 billion.

The other big hope is that volume could exceed expectations. An operating average of 85 pct would give a profit on sales of better than 8 pct, says a top steel analyst.

Another pleasant bonus could develop if the 8 pct tax credit for investment is approved.

Pinch Remains—If none of these extra lifts appears, the mills will have subnormal peak earnings after subnormal slump earnings.

Industry's Prospects After Atomic Attack

Government expert says if plants are lost, but the people survive, recovery is possible.

Production in the first year following an atomic attack could equal one-half the surviving capacity.

By P. J. Cathey

■ If atomic attack comes, what are industry's chances for survival? What problems would it face in reviving production?

Government and industry experts took a hard look at these questions during last week's symposium on industrial defense planning. The meeting, held at the Bristol, Pa., plant of the Rohm & Haas Co., included a tour of a company shelter equipped to house 1700 employees. The symposium was co-sponsored by the National Institute for Disaster Mobilization, New York.

Here's how the speakers saw U. S. industry faring during—and after—a nuclear bombing:

Two Problems — Richard Hellman, chief economist, Business & Defense Services Administration, U. S. Dept. of Commerce, pointed out industry's main jobs after an attack will be (1) getting production going to maintain life, and (2) beginning the industrial recuperation which will be inevitable.

"In a nuclear bombing industry will face blast, fire, and fallout," he said. "Above this, its ability to recover will depend on the strength of its production communities and the production mesh available."

The limiting factor in Mr. Hellman's opinion: How quickly and how well the pieces of the production mesh can be put together. It will do little good to turn out parts if they can't be used in larger assemblies.

Barren Islands—"In previous emergencies the productive capacity was always available. Now, after an attack there would be islands of destruction. Some industry would be directly knocked out, other industry physically damaged, and some untouched."

How successful industry is in recovering will depend a great deal on how the work force survives, he added. "If we lose the people and keep the plants, they are of little value. But if we lose the plants, and keep the people, recovery is possible."

The Variables—What happens to industry depends on the severity of the attack, the bomb patterns and the fallout. Determining the size of any attack is difficult.

But based on computer analyses of some possibilities, post-attack production in the first year could equal one-half the surviving capacity.

What can industry do now about post-attack plans? Mr. Hellman suggests a review of supplier complexes. Manufacturers can decide what alternate sources of supply could be used. They can analyze production to see what steps may be eliminated or modified.

Industry's Authority — Business should not underestimate its importance in such an emergency, he concluded. "Industry has more authority than any other aspect of community life, including government. It should tell employees what must be done."

Another speaker, William Durkee, deputy assistant secretary of defense, said that the U. S. with the aid of the Census Bureau, is now making a survey of all structures in the nation which could serve as fallout shelters for 50 or more people.

Trade Groups See General Upturn

Trade assn. executives feel bottom has been reached and an upswing into 1962 has begun.

Optimistic outlooks were voiced by executives of steel warehouses, tool and die shops, stampers, forgers, foundries and other industries.

■ Metalworking trade assn. executives feel the worst of the recession in their industries is over and an upswing for 1962 has already begun.

The Cleveland chapter men who represent national headquarters for steel warehouses, contract tool and die shops, stampers, forgers, screw machine products and steel, iron and malleable foundry groups aired their views last week.

Industry outlooks at the moment:

Steel Warehouses—Shipments in 1961 will match those of 1960, which were 6.1 million tons of industrial steel products, according to Robert G. Welch, executive vice-president, Steel Service Center Institute. Shipments have shown signs of improvement in the last two to three weeks. Indications are that business will continue to improve into next year.

Many warehouses now do first operation processing on 60 pct of their tonnage; some do up to 90 pct. Stocks on hand are now 3.3 million tons. A modest increase is expected in the first half of next year. Before the '59 strike, stocks peaked at 3.7 million and hit 3.8 million tons by June of 1960, about 5 months after settlement.

Tool and Die Shops—Sales for 1962 should be $1.1 billion, or 15 pct higher than the $960 million total this year, according to Chas. R. Bender of the National Tool, Die and Precision Machining Assn. Last year they were $1.2 billion.

Greatest contributing factor will be substantial new orders early next year from the auto industry, involving major model changes and new tooling for 1963 cars. Backlogs are now 10 pct above September. Defense spending increases are also expected.

Forgings—The feeling of hesitation that was retarding business a year ago has been replaced by an awareness that the U.S. people want goods and services in unprecedented volume, according to W. A. Carlile, Jr., president of the Drop Forging Assn. Dwight Allgood, executive secretary, claims Mr. Carlile's viewpoint means industrial production will inevitably be reflected in forging sales.

Stampings — The last three months of this year have been the best since 1956, according to Jeff Keith of American Metal Stamping Assn., formerly the Pressed Metal Institute. This is an encouraging trend which will continue and surpass our best figures, Mr. Keith adds.

Based on reliable predictions, the future market for metal stampings is good. But loss of markets to competitive methods and products dictates the need for basic research.

Screw Machine Products—October dollar volume was up 20 pct over January and the year 1962 should be 15 pct or more over this year, says Orrin B. Werntz of the National Screw Machine Products Assn.

This has been the shortest recession since figures were started in 1926. The association will soon start taking in supplier members.

Steel Castings—Farm equipment demand has improved quite a bit in the last few months. Railroad demand has hit bottom.

Aluminum Antitrust Decision in December

The Senate antitrust subcommittee will decide this month how far it should go in its aluminum industry investigation. The decision may be either to hold full-scale hearings, to turn evidence of antitrust violation over to the Justice Dept., or to drop the probe. The latter is doubtful.

Bernard Fensterwald, subcommittee staff director, told The Iron Age the decision would be made sometime in December. He said during the month the subcommittee expects to have information subpoenaed from more than 20 aluminum companies in its hands. "We can't make a decision until it's all in," he said.

Fensterwald said returns from small extruders in the industry were all in. Only some of the larger companies have not yet replied. The subcommittee has given them extensions. He said all large aluminum companies have been asked for information, including the big three—Kaiser, Reynolds and Alcoa.

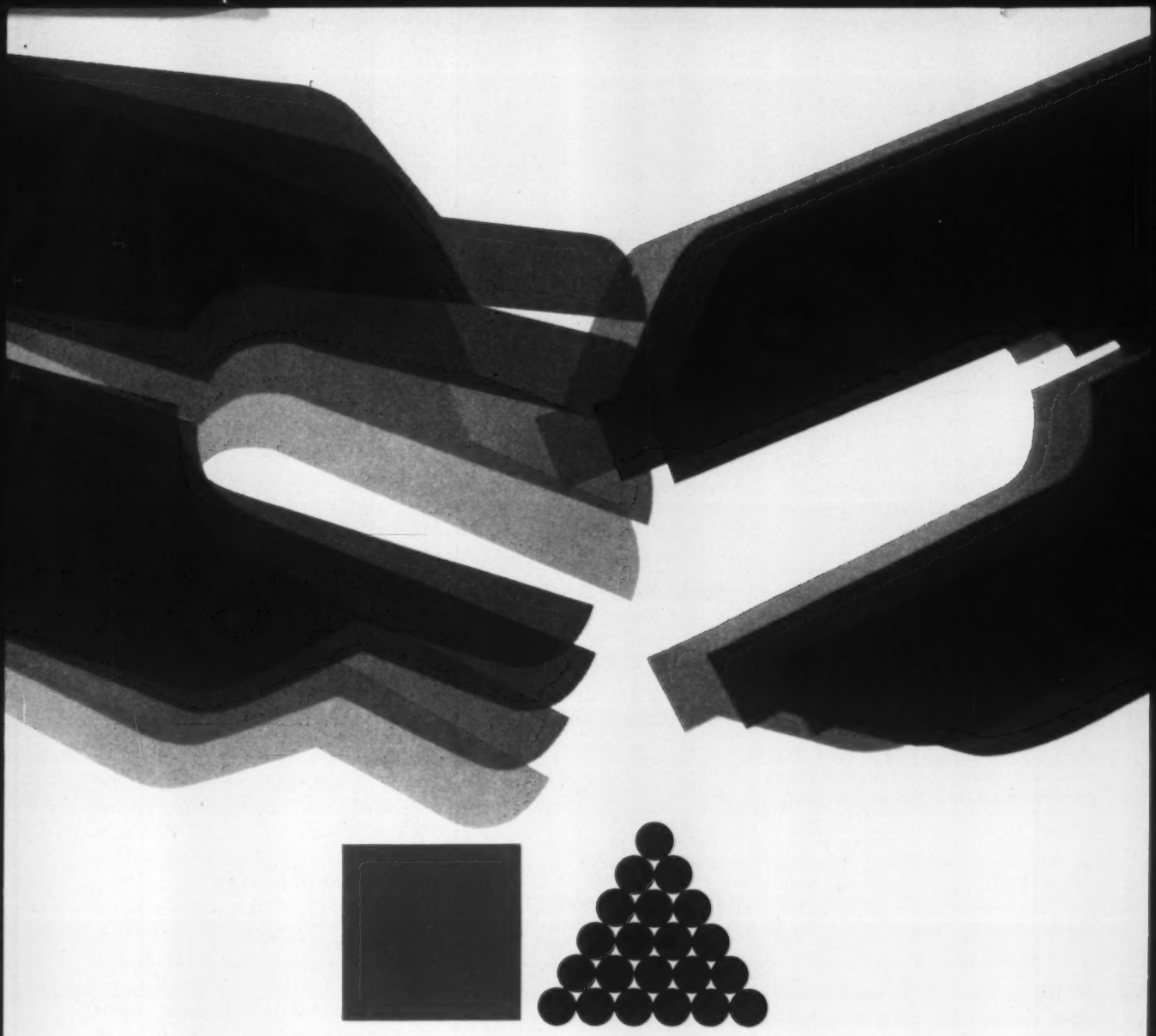
The subcommittee, headed by Sen. Estes Kefauver, is on the trail of price fixing in the industry. It is trying to obtain "records of aluminum company officials who may have been engaged in illegal activities," Fensterwald said.

More Details Needed To Push Retraining

The U. S. Labor Dept. will report to Congress next session on whether or not job retraining of the unemployed is effective. Labor Secretary Goldberg will make the report based on experience with retraining programs now underway in redevelopment areas.

The report was requested by Sen. Kenneth B. Keating (R., N. Y.) who feels more information on the program may get it through Congress.

The new area redevelopment act contains $4 million for retraining workers in depressed areas. Sec. Goldberg says several retraining programs in these areas are already underway.



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INDUSTRIAL BRIEFS

For Thin Tinplate— Mesta Machine Co. of Pittsburgh, Pa., has received a contract to build a cold mill and auxiliary equipment for the Weirton Steel Co. The installation will cold-reduce steel strip.

Space Research — Avco Corp's Research and Development Div. is erecting a new space vehicle laboratory in Wilmington, Mass. It will work to simulate conditions encountered by space vehicles returning to earth.

Stainless Production — Jones & Laughlin Stainless and Strip Div. is installing new equipment at its Louisville, O., plant. A bright annealing line will process material up to 51 inches in width.

Gas Facility—Air Products and Chemicals, Inc., has placed on stream a facility to produce oxygen and nitrogen. It is located in Cleveland.

Alabama Construction — The H. K. Porter Co., Inc has completed an expansion and modernization program at its Bessemer, Ala., refractories plant.

Fayetteville Expansion—Precision Castings Co. plans to expand its Fayetteville, N. Y., manufacturing facilities.

Plastics Conference — "Plastics Revolutionize Design" is the theme for the Annual Technical Conference of the Society of Plastics Engineers to be held in Pittsburgh, Jan. 30 to Feb. 2, 1962.

Cryogenics Laboratory—Rocketdyne Div. of North American Aviation, Inc., has put into operation a cryogenics lab for testing materials.

Applied Research — The Princeton Applied Research Corp. has been formed to develop and manufacture electronics instruments. A power reference source will be its first product.

Licensing Agreement — Eaton Manufacturing Co. has signed an agreement with an Argentine firm to make its engineering and manufacturing knowhow available to it. Compania Metalurgica Argentina AE is a manufacturer of leaf springs used in the automotive and railway industry.

Name Change — The Towne Robinson Nut Co. has changed its name to Towne Robinson Fastener Co. There are no other organization changes.

Spring Wire—The Atlantic Steel Co. of Atlantic, Ga., has added a line of upholstery grade high carbon spring wire to its product output.

Sonic Cleaning—Pacific Scientific Co. has been appointed western manufacturer's representative for the Pioneer-Central Div. of the Bendix Corp. Pacific Scientific will handle all the company's sonic energy cleaning units.

Nonferrous Machining — Onsrud Machine Works, Inc., has opened a Non-Ferrous Material Machining Center. It will be a testing ground for machining innovations in the nonferrous field.

Corporate Identity — American Machine & Metals, Inc., has changed its name to AMETEK, Inc. The change is part of a corporate program to get quick, clear recognition for the company and its products.

Fabricating Division — Idaho Maryland Industries Inc., of Los Angeles, Calif., has established a new steel fabricating division in Tucson, Ariz.

Geologist Feted—Dr. Ian Campbell, a California State Geologist will be the 1962 recipient of the Hal Williams Hardinge Award of the American Institute of Mining, Metallurgical and Petroleum Engineers. Presentation will be in New York in February.

Cost Cut—Millmaster Chemical Corp., announces the availability of methyl carbamate in commercial quantities. Economic processing has brought down the cost of the versatile compound.

STI President—M. S. Bandoli of Pendleton Industries, Inc., has been elected president of the Service Tools Institute.

Electronic Warehousing — Westinghouse Electric Corp., has installed a million dollar warehousing and storage system at its Transformer Div., Sharon, Pa. Both raw materials and finished products can be controlled by the IBM system.

Tube Expansion — Wheatland Tube Co. has announced a major expansion plan at its Wheatland, Pa., facility. The three-year program will commence with the erection of a storage and shipping warehouse.

ICI Awards — The Investment Casting Institute honored two of its leaders for outstanding contribution to the technical development of the industry. Dr. Jack Keverian of General Electric Co. and C. A. Crawford, technical director of the Institute, were honored.

European Production — Reliance Electric and Engineering Co. of Cleveland has arranged for production facilities in Switzerland and has broadened its licensing agreements in England in an effort to gain more of the Western European market.

Automatic Teaching—Burroughs Corp. has created a new division for auto instructional systems. Dr. F. F. Kopstein will direct it.

Foundation Grant — Case Institute of Technology has received a grant from the Ford Foundation for $8 million to help the school's scientific, engineering and management education efforts.

Tabular Alumina — Kaiser Aluminum & Chemical Corp. has increased the capacity of its Baton Rouge, La. works giving it five times the capacity for production of the aluminum oxide.

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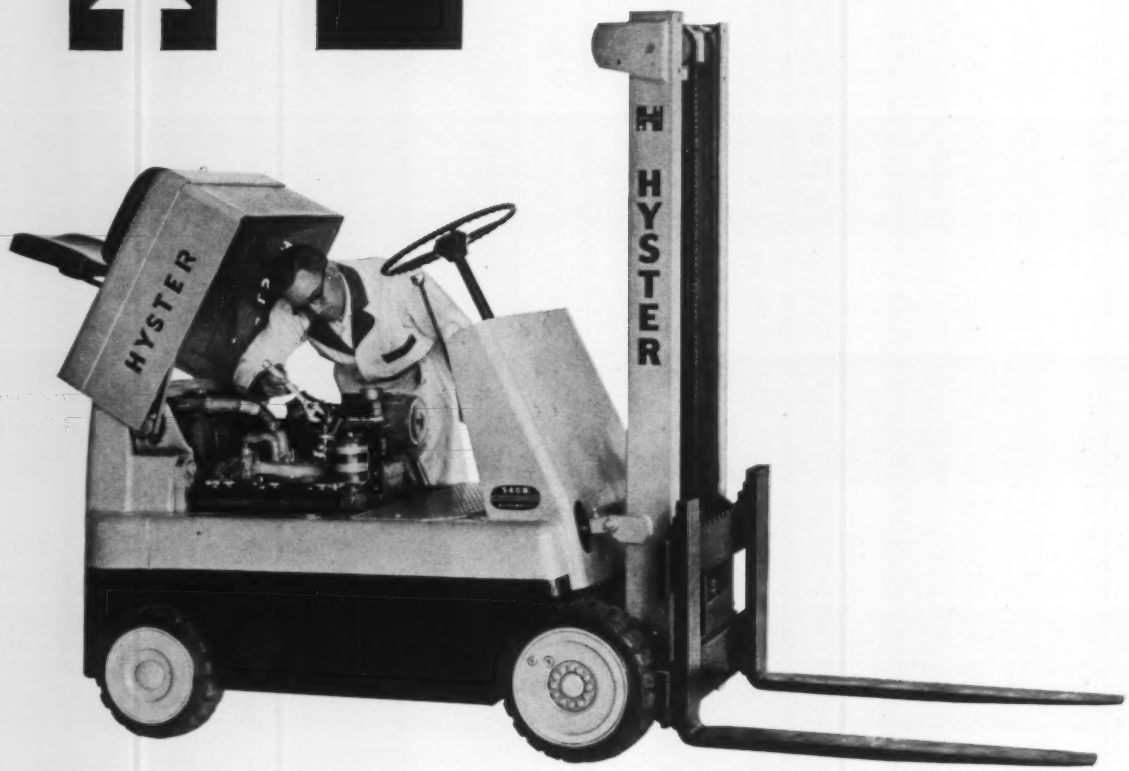

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What Are Computers' Limits?

Computers are invading management functions to a great degree. The question is, what are the limits.

Computers will be a vital factor in some areas, but role in decision-making is debated.

■ Will computers automate management?

Opinions vary on how much and in what direction. But computer-based management systems are becoming a reality. Some experts believe the process won't "mechanize" management, but improve decision making by providing more and better facts—faster.

One authority, Dr. Alan J. Rowe, manager, Industrial Dynamics Research, Hughes Aircraft Co., recently examined the issue in detail. Addressing an instrument-automation conference of the Instrument Society of America, he summed it up this way: "This is not the 'mechanization' approach. Principles are being applied which consider the total problem.

Systems Challenged — "There may be organizational changes accompanying a computer-based system. But the net effect should be better decision making and control due to more timely and accurate information.

"The computer will play a vital role as an aid to management at the policy-making and control levels. It will also provide for automated information processing at the operating level."

The ability of the computer to digest and process facts is seen as a management aid by many authorities. R. K. Summit, computer scientist for Lockheed Missiles & Space Co., states, "Computers will bring changes to management more extensive than the industrial revolution brought to manual jobs.

Fast with Facts — "Computers are, in fact, new 'machine tools' through which logic and mathematics and quick handling of many, many facts can help with the job of management."

Results of a two-year study of management information systems, just published by the American Management Assn., show most of those surveyed believe the computer is here to stay.

The report, "Management Information Systems and the Computer," adds, "Talk that computers will replace managers is fanciful. Managers' work is going to become **more** important and managers **more** numerous.

Management Varies — But the manager of the 1970's will need all the help he can get—His job will be so complex, so big, so demanding that he will not be able to do without these tools for simplifying it."

Space age executives at Lockheed are now practicing top management on a computer. Specialists have programmed into a computer a complete, if fictional, industry. This "aerospace industry environment" includes sales trends, government attitudes, and many other factors.

. . . Strong at Operating Level

■ The best area for automation is at the operating level, according to Dr. Rowe.

He makes this analysis: The typical manager spends over half his time with people—his superior, persons at his own level and his subordinates. Up to 25 pct of the typical manager's time is spent in planning and organizing the work to be done. About 20 pct of the time goes into evaluating data, reviewing subordinates, and related work. Only 5 pct is spent in actually making decisions.

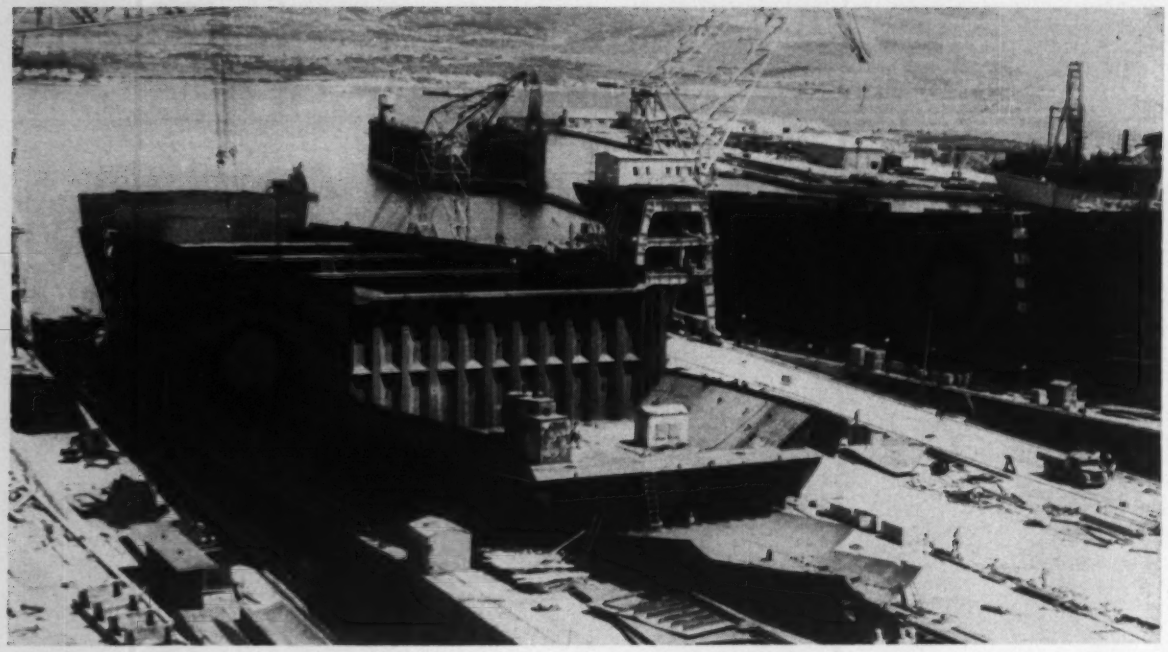
On Policy—Policy decisions, he observes, are often based on a blend of intuition, experience, and emotion. "It hardly seems possible to automate these decision bases, although progress is being made in understanding the methodology of the decision process.

"If we define middle management's function as control, then automation can be imposed on certain well-defined aspects of this activity."

Biggest Opportunity — However, "at the operating level, where the physical processes in a system are applied, there is the highest opportunity for automation.

"Numerous examples exist of automated data processing, especially in production and inventory control and accounting. . . . The interesting fact, however, is that in all of these instances of automation, supervisors are still required to deal with the workmen.

"The conclusion seems to be that specific ativities can and have been automated, yet the management function, although modified, still persists."



SHIPBUILDING BOOM: Laying the hull for a 22,000-ton bulk carrier being built by Split Shipyards.

Yugoslavia's Industrial Plans Outrun Financial Growth

The nation's economists are confident that industrial capacity will double by 1965.

But all signs point to a huge deficit in Yugoslavia's trade balance by then.

By S. D. Smoke

■ Yugoslavia has made much economic progress since it broke with the Comintern in 1948 and started its own government-enterprise system in 1950. In spite of this, an estimated $300 million goods and services deficit is forecast in her trade balance by 1965—if she succeeds in carrying out her current five-year plan.

Observers there seem sure there will be a million-ton steel mill in Skopje and that industrial capacity will nearly double by 1965. They also think a network of highways will be completed and that the railroads will be expanded and converted to broad gage track. And they believe more farmers will be moved to the cities.

But ask an economic planning official how Yugoslavia expects to make up its deficit in the balance of payments, and he will tell you:

Not Worried—"Why worry about money at this stage of our growth and development? If we don't advance, we'll never be able to pay anybody. If we go full steam ahead, we will increase our capacity to produce and, therefore, our ability to pay."

Yugoslavia is a member of the International Monetary Fund, and of the International Bank for Reconstruction and Development. She maintains observer status with the Organization for Economic Cooperation and Development. She also has partial association with the General Agreement on Tariffs and Trade (GATT).

Full association with GATT may not be far off. That's because Yugoslavia wiped out its multiple foreign exchange rate structure this year. She now complies with other GATT principles on more liberal trade.

Credit and Loans—As expected from any country in its first stages of industrialization, credit and loans are at the core of almost everything done in Yugoslavia.

Investment capital comes from three sources. Each source gives about one third: The Yugoslav Investment Bank—from foreign loans and centralized tax funds; the Enterprises—from depreciation and profits; the local authorities—Com-

munes, Districts and Republics—from funds at their control.

In practice, all three take part in capital ventures. But local support is rarely related to a project's national importance. Very little local financing is given, for example, to railroad, highway, hydro-electric and steel mill building. Depreciation and profits enable enterprises to replace and modernize such facilities to a degree. But the vast growth needed in these areas makes them a national responsibility.

Investment Bank—The planned scope of these projects is, of course, beyond Yugoslavia's present investment capability. To meet these goals, the Yugoslavia Investment Bank serves as the focal point for capital growth. It handles funds built internally through taxation. It also negotiates external loans and guarantees satisfactory credit arrangements between a Yugoslav enterprise and a foreign supplier.

Since 1959, Yugoslavia has obtained close to $150 million in development loans from the Export-Import Bank, and the Development Loan Fund. It has also obtained a 3 million pound loan from Great Britain and other loans from other countries. This money has been used to build nitrogen fertilizer, thermonuclear, chemical and hydro-electric plants. It has also helped to expand a steel works and resulted in the purchase of 98 General Electric diesel locomotives.

Yugoslav authorities hope the U. S. will launch a credit arm.

In the years ahead there is likely to be more social ownership instead of less, as underdeveloped countries try to obtain self-sufficiency and a higher standard of living. International cartels will become even stronger as the developed countries' capacity to produce exceeds demand. Communist countries will enter world markets more vigorously across the board.

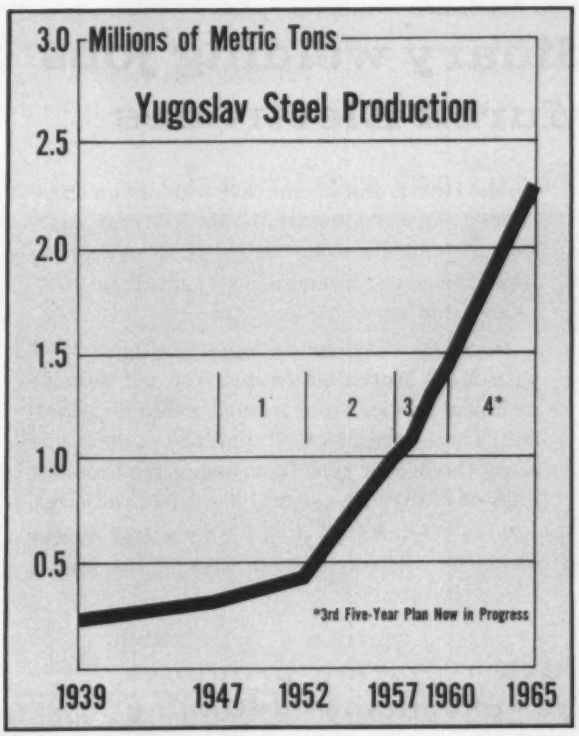
At Crossroads—Yugoslavia is at the crossroads between East and West.

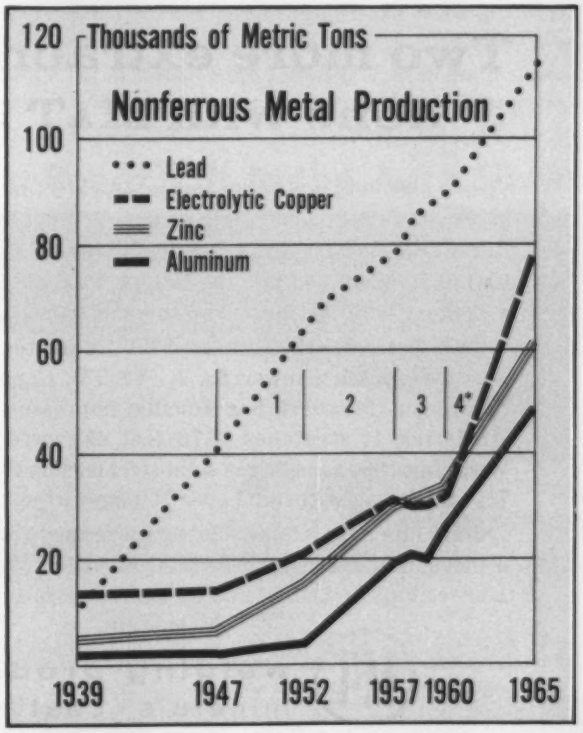
Background for Yugoslavia Trade Debate

This is the second of two articles on Yugoslavia. They were prepared at the request of the editors of The Iron Age by Mr. Smoke, a former associate editor of this magazine, now a Washington consultant. His visit to Yugoslavia not only was cleared with various U. S. government agencies; it was made through their cooperation.

It is not an argument either for or against trade with Yugoslavia. This factual report about the country and its relations with the U. S. and other Western powers should, we believe, prove useful as background for the current debate on whether or not the U. S. should continue to trade with Yugoslavia.

How Yugoslav Metalworking Is Growing





Two more extraordinary welding jobs done with M&T Murex Electrodes

THIS 6,588,000-LB. SHOVEL on the 50-yard line of a football field could dig a 65 cu. yd. dipperfull in one end zone, lift it 140 feet high, swing its 170-ft. boom and pile the 100 ton load atop a 12-story building in the opposite end zone.

THE TALLEST MAN-BUILT STRUCTURE, the new transmission tower for KFVS-TV, Cape Girardeau, Missouri has equally impressive statistics. It stretches 1676 feet skyward. Weighing 1000 tons, it has solid steel legs up to 7½" thick, can withstand over 100-mph winds.

Joint integrity is an absolute requirement for a shovel that chews up huge bites of earth...or a tower built to be buffeted by hurricane-force winds. Isn't it significant that welding on these giant jobs was done with M&T Murex electrodes? The electrode that's good enough to meet these requirements is certainly good enough for everyday jobs too.

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Iron Curtain Auto Output Low

Russia and satellites are lagging in car production and there's little chance for improvement.

The production of a 'people's car' is still far in the future, and not in current plans.
By A. E. Fleming

■ Behind the Iron Curtain, the Man in the Street continues to walk.

Unless he owns a bicycle or motor scooter.

For whatever plans Russia and its satellites may have for providing their citizens with a 'people's car,' the fact remains that auto output in Soviet Bloc nations is of peanut proportions and may well remain that way for many years.

The Facts — Data compiled by the Automobile Manufacturers Assn. from overseas trade organizations and the U. S. Dept. of Commerce clearly show why Soviet citizens embrace the pedestrian form of travel.

The four Red countries which reported vehicle production in 1960 built 216,067 cars out of a world total of more than 12.8 million.

This amounted to 2.0 pct of global volume, slightly less than the 2.2 pct share compiled in 1959 when they turned out 241,990 cars out of 10.7 million.

Production Records—By country, Communist production in 1960 was: USSR, 139,000; Czechoslovakia, 56,211; East Germany, 53,000; Poland 12,856.

Besides the U. S. and Canada, other nations that bettered Russia, the top Red producer in 1960, were West Germany, 1,674,298; United Kingdom, 1,352,728; France, 1,133,305; Italy, 595,907; Australia, 305,095; and Japan, 165,094.

Percentage changes in 1960 compared to 1959 indicate 11 pct boosts for the USSR and Czechoslovakia, a 10 pct drop for Poland and no change for East Germany.

Low Increase — The four countries combined for an 8 pct increase over 1959. But this is well below the 18 pct rise for world output.

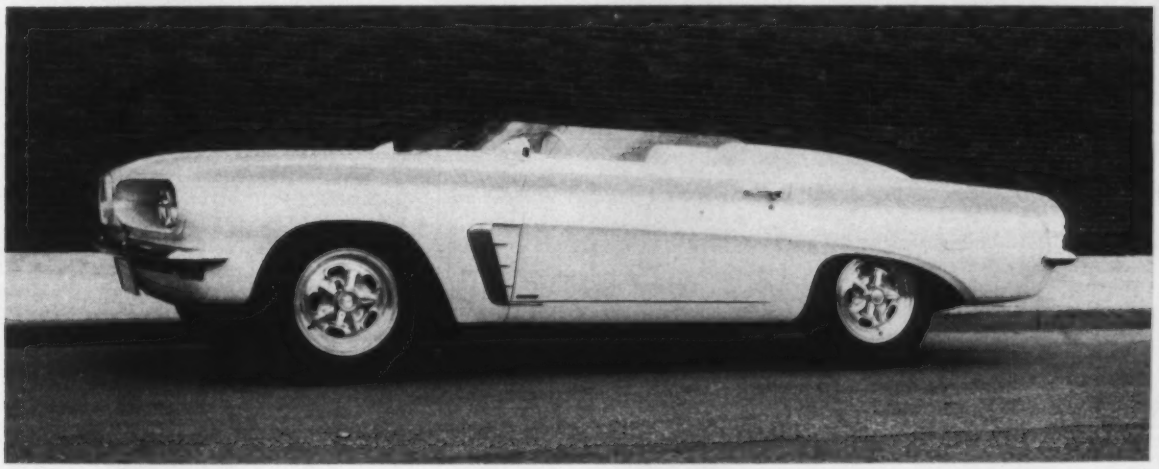
From what can be interpreted from recent Seven Year Plans, Soviets do not rate auto assembly very highly on their list of future accomplishments. This may be because of the large quantities of steel and other materials that would be consumed by mass production.

But even if these four countries showed production gains of 100 pct in the next few years, annual car volume would stand at only some 500,000 units—less than American plants make in one month.

Propaganda Factor—Meanwhile, although Russian roads are rather bare of privately-owned automobiles, the USSR exports about 20 pct of the cars it makes. Soviet officials believe there is something to be gained in the way of propaganda by dispatching their wares around the world. Principal importers of Russian cars, in addition to the satellites, are Afghanistan, Burma, Finland, Iceland and Norway.

At the end of 1960 there were but 3,760,000 cars in use in Russia, the same number as a year earlier.

Fresh From the Drawing Board, Off to the Auto Shows



PONTIAC'S MONTE CARLO: The experimental show car is 175 in. long and 44 in. high with a 97-in. wheelbase.

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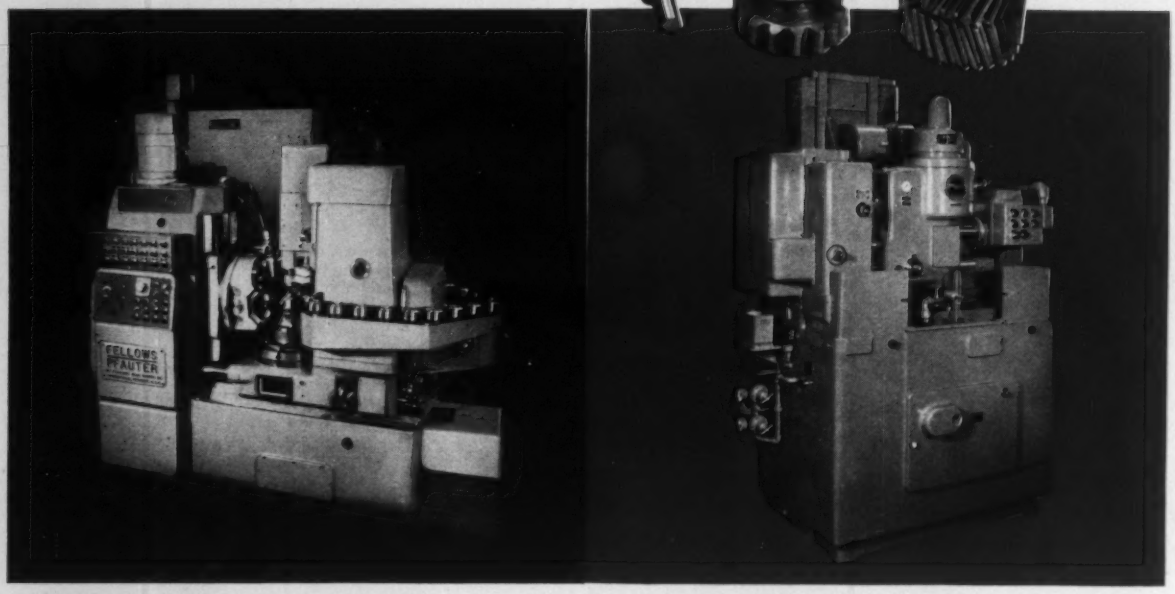

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Farwest Plant Buildup Grows

Expansion Reflects New Prospects for Metalworking

New plants go up and others continue to expand in growing California.

The latest list shows more companies moving West with branch operations. And the product range is widening.
By R. R. Kay

■ California plant expansion reflects the area's vigorous economy.

There are noticeable trends in the current list of growing firms:

1. More old-line eastern and midwestern companies are setting up divisions.

2. The number of electronic plants continues fast growth.

3. There is an ever-widening range of manufactured products.

Good Prospects—Here are some of the new and expanding plants. They're all prospects for metalworking products and services:

Electronics Div. of National Cash Register, Hawthorne—computers; Chemical Contour Corp., Gardena—chemical milling; Superweld Corp., North Hollywood—metal joining and brazing.

Fluidmaster, Inc., Anaheim—control valves for plumbing fixtures; Mincom Div. of Minnesota Mining & Manufacturing Co., Los Angeles— magnetic recorders and reproducers; Tak-Trak, Inc., City of Industry—tools for carpet installation.

Missile Parts—Micronics Div. of Elgin National Watch Co., Chatsworth—parts for missiles and electronic equipment; Rocket Jet Engineering Corp., Glendale — aircraft parts; Transformer Engineers, San Gabriel—transformers.

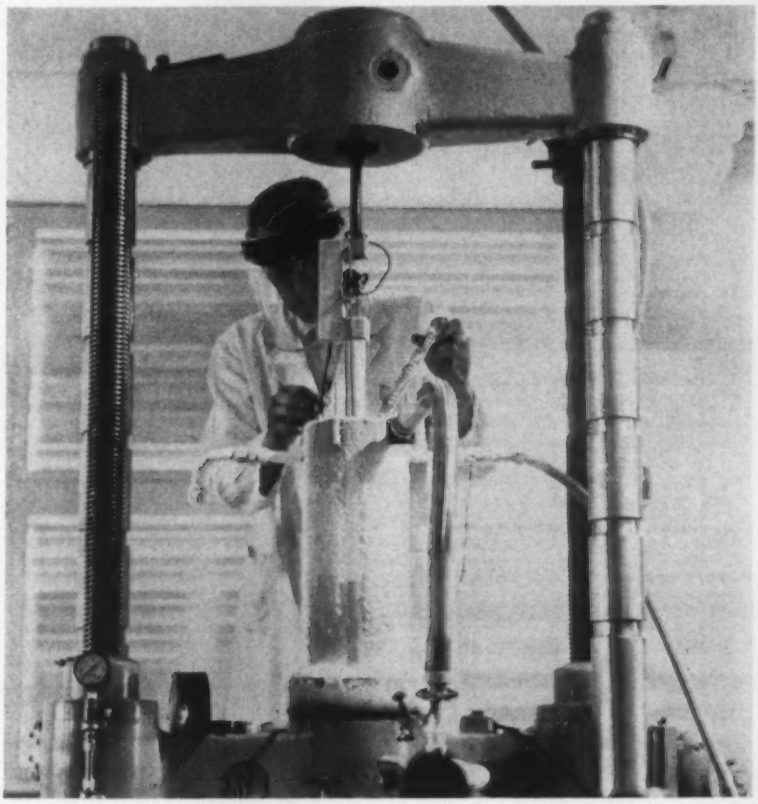
Beryllium Technology Corp., Rancho Conejo—missile and electronic components; Universal Molding Co., Lynwood — roll-formed metal products; McCulloch Corp., Los Angeles—propellers.

Fleetwood Manufacturing Co., South El Monte—swimming pool heaters and water heating equipment; Automation Industries, Inc., Torrance — ultrasonic testing and electronic components; Altec Lansing Div., Ling-Temco-Vought, Inc., Anaheim—sound systems.

Test Equipment — Spectra-Physics, Inc., Mountain View — electronic instruments; Presray Corp. Div., Pawling Rubber Co., Palo Alto — ground support equipment for missiles; Indamer Electronics, Inc. Sunnyvale — semi-conductor test equipment.

Food Machinery Corp., San Jose —ordnance and international operation; Fairchild Semiconductor Corp., Standford Industrial Park—electronic components.

Cold Enough at Minus 423°



COLD LAB: Engineer at Rocketdyne cryogenics lab at Canoga Park, Calif., installs liquid level sensor in cryostat. The test will determine effect on metal of liquid hydrogen at a frigid minus 423°F.

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75-Ton ALLIANCE Manipulator:

Wheel Base	38 feet 5 inches
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Bits- 68 inch square maximum
10-1/4 inch sq. minimum

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OutlookGoodDespiteOrderDrop

October Dip Follows Rash of Buying in September

But total order rate for the first 10 months is well above last year.

Inquiries mount on heavy presses, which have been dormant most of the year.
By R. H. Eshelman

■ Most signs pointed "up" this month for future machine tool business. This was in spite of a drop in both metal cutting and metal forming tool orders during October, compared with September.

Some feel September's orders were falsely inflated by a rash of last-minute buying to beat the deadline for a number of general-line price increases.

As a result, October's net new orders of $48.5 million for metal cutting machines appears to be a big drop from the $55,650,000 of September. The same holds true for net new orders of metal forming machines. They were $8,450,000 for October, compared with $10,-950,000 in September.

Top '61 Orders—However, October's net new orders for metal cutting machines for the first 10 months are now near the $461 million mark. That's more than 10 pct above the order level for the same period last year.

Foreign net new orders also continued at a good clip. This year's 10-month total is about 31 pct above the first 10 months of 1960. In fact, the National Machine Tool Builders Assn. points out that foreign net new orders are running 51 pct of domestic orders for 1961.

Figures for metal forming machines were less encouraging. Metal forming type machine tool net new orders for the first 10 months this year were 18.5 pct below the first 10 months of 1960.

Big Gain—However, total machine tool orders for the first 10 months is a big gain over last year. Shipments are running behind 1960 and even 1959. But according to Howard Maynard, president of Snyder Co., "this signifies that future business is on the upgrade."

He believes 1962 should surpass both '60 and '61, although perhaps by no more than five pct.

Mr. Maynard points to many automation programs underway, especially for foreign auto and other high-production lines. He expects more business from these sources, particularly Australia. He says Italy has good potential and that business may swing up in other areas of Europe, including France. West Germany continues to hum along.

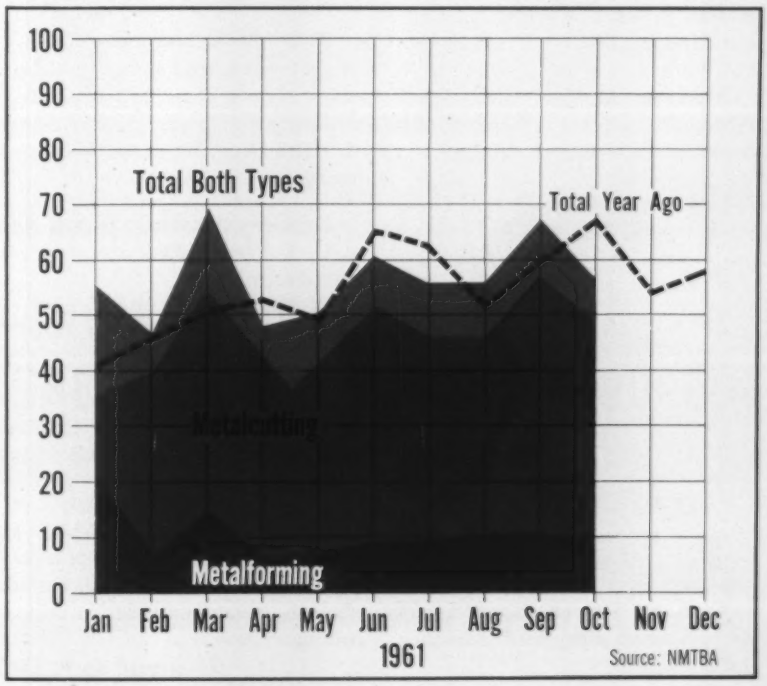
Press Field—Despite disappointments this year, there's still optimism in the press field. Heavy presses have been dormant nearly all year. But now there are definite signs of activity. Inquiries have improved during the past few months. Can machinery has held up well. Export prospects continue excellent.

"If car production holds up, business should definitely improve," one source explains.

High production cutting types of machinery also continue strong.

MACHINE TOOLS–NET NEW ORDERS

In Millions of Dollars — Metal Cutting and Forming Types



MEN IN METALWORKING

E. C. Myers, appointed vice president, United States Steel Corp.

Beckman Instruments, Inc.—W. W. Wright, named executive vice president, administration; Robert Erickson, named chief operations officer.

Chrysler Corp. — E. P. Engel, named vice president and director of styling; J. P. Smith, appointed marketing manager, and J. L. Finkelmann, named sales manager-industrial products, Cycleweld Chemical Products Div.

American Motors Corp. — Roy Abernethy, elected executive vice president and general manager.

C. E. St. Thomas, named senior vice president, Engelhard Industries, Inc.

United States Steel Corp.—R. H. Larry and W. L. Lohrentz, appointed administrative vice presidents, personnel services.

U. S. Industries, Inc. — C. E. Lamar, appointed president, Southern Pipe Div.

Mueller Industries, Inc.—A. J. Mueller, named president.

Shinn Engineering, Inc.—P. W. Leake, appointed president; John Meisenbach, named vice president.

Waldes Kohinoor, Inc.—Dr. H. K. Waldes, elected chairman of the board; George Waldes, elected president.

U. S. Science Corp.—L. D. Rexroat, elected president and chairman of the board.

Aerospace Industries Assn.—Dan A. Kimball, elected chairman of the board of governors; W. M. Allen, named vice chairman; A. C. Esenwein, elected president.

Apex Smelting Co.—W. R. Bayer, elected president.

Rockwell Manufacturing Co.—R. R. Bush, named vice president, sales; T. O. Carson, named asst. vice president, sales. Both of Meter & Valve Divs.; W. L. Neely, elected treasurer.

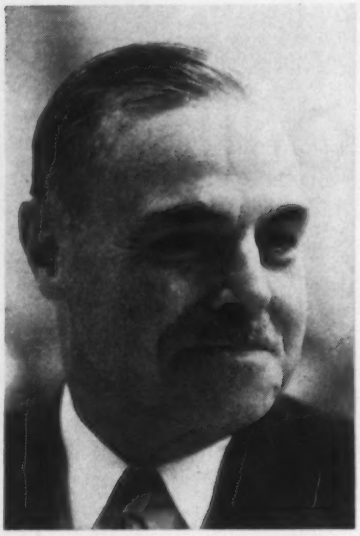
Reynolds Aluminum Supply Co.—H. S. Parr, named vice president and director.

Soulé Steel Co.—G. S. Ford and C. C. Williamson, appointed vice presidents.

Anaconda Co.—W. E. Quigley, elected vice president and comptroller.

Electric Machinery Mfg. Co.—R. J. Mullenbach, named vice president and a member of the board; Horace Gelinas, named manager, manufacturing.

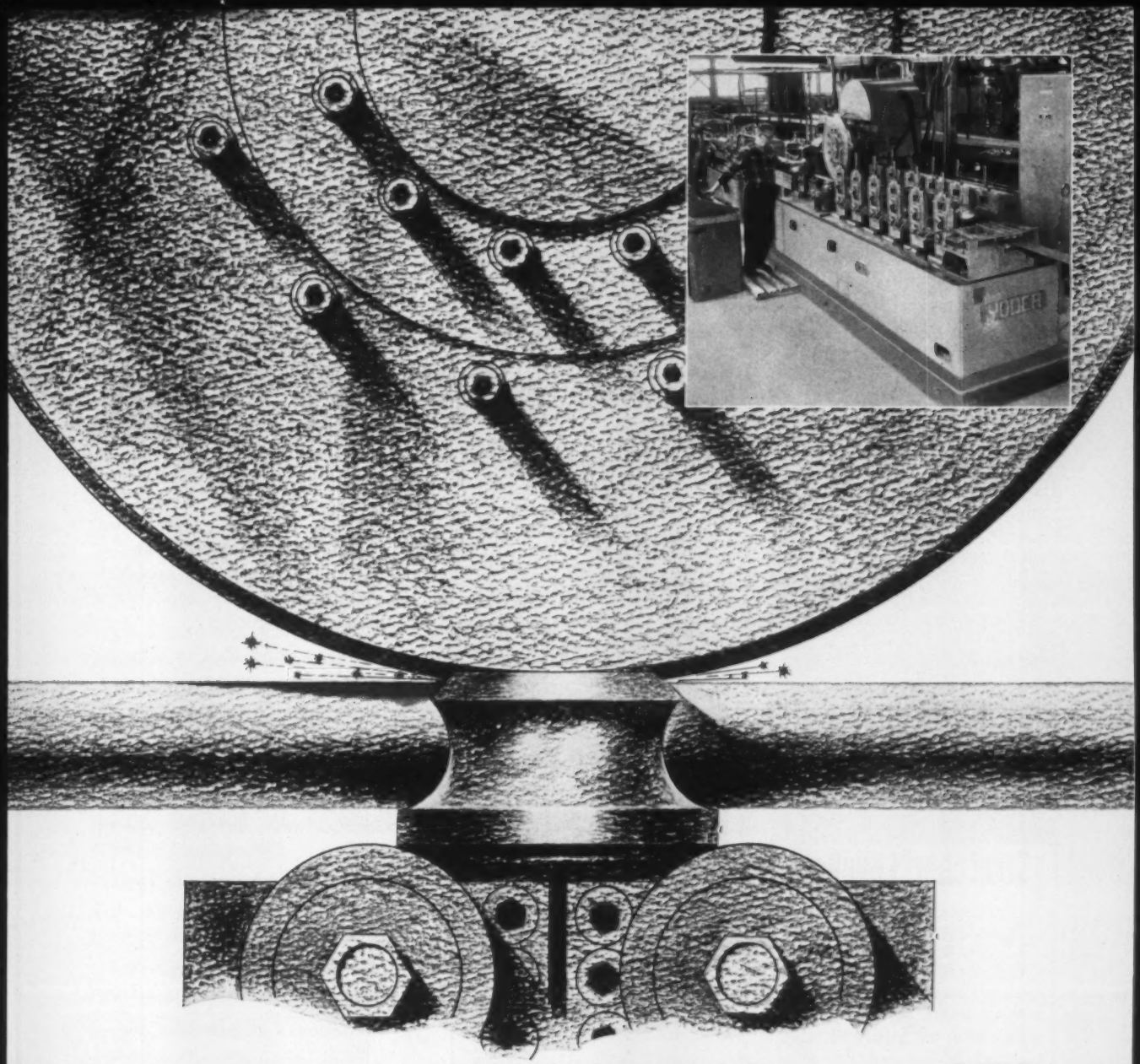
(Continued on P. 106)



P. B. Wishart, elected chairman of the board and chief executive officer, Minneapolis-Honeywell Regulator Co.

J. H. Binger, elected president, Minneapolis - Honeywell Regulator Co.

S. F. Keating, elected executive vice president, Minneapolis-Honeywell Regulator Co.



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Gray Iron Castings

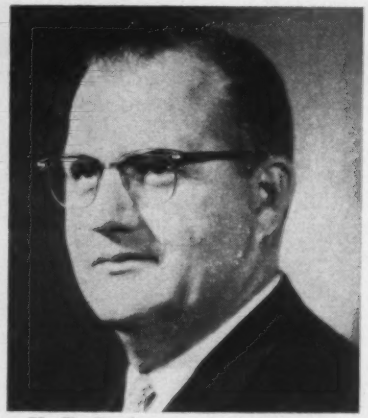
(Continued from P. 104)

Air Reduction Co., Inc.—A. R. Rios, appointed vice president, Airco Co. International; W. W. Littlefield, appointed manager, Air Reduction Sales Co.'s Arlington district; J. R. Kirwin, named asst. manager, gas sales, Philadelphia.

Allen-Sherman-Hoff Co.—R. P. Spreter, named vice president, sales; F. W. Winkelman, appointed vice president, engineering and service; R. W. Fitzmaurice, named sales manager.

Associated Spring Corp.—W. A. Campbell, elected president, Wallace Barnes Co., Ltd., Canadian subsidiary.

Kerns United Corp.—R. W. Kenyon, appointed vice president, sales.



K. E. Peglow, named vice president—manufacturing, Clearing Div., U. S. Industries, Inc.

E. J. Baumrucker, appointed executive vice president — domestic operations, Clearing Div., U. S. Industries, Inc.

P. C. Ewbank, named executive vice president, Union Steel Products Co.

Ekco-Alcoa Containers, Inc.—J. W. Carlile, elected vice president, marketing; J. B. Blane, elected vice president, engineering.

Gleason Works—H. F. Carver, appointed vice president and general manager.

Motec Industries—S. M. Reynolds, appointed vice president, industrial relations; H. A. Phillips, appointed asst. director, procurement.

Luria Brothers & Co., Inc.—Louis Zinader, appointed asst. vice president, Eastern Region.

Norris-Thermador Corp.—H. J. Meany, elected vice president.

Pendleton Tool Industries, Inc.—H. W. Oetjen, named vice president and general domestic sales manager.

Space Equipment Corp.—E. L. Schoenlein, appointed vice president, sales, Thompson Industries Div.

Ultrasonic Industries, Inc.—P. E. Brodrick, elected vice president-finance.

Benerson Corp.—Herman Kockritz, appointed vice president, Benematic Div.

Fairchild Stratos Corp.—F. E. Newbold, Jr., named corporate director, Washington operations.

Thrall Car Manufacturing Co.—C. A. Mapp, named vice president.

Rich Steel Co.—Jack Sutherland, named vice president and sales manager.

Youngstown Sheet & Tube Co.—W. G. Laffer, elected a director.

Crucible Steel Co.—W. C. Meyer, appointed asst. to the vice president; E. M. Underhill, appointed manager, engineering, Magnet Div.

Lee-Norse Co. — J. W. Fisher, appointed controller.

Brooks & Perkins, Inc.—A. X. Schmaltze, elected treasurer.

Driver-Harris Co.—R. B. Allardice, Jr., elected treasurer.

Foxboro Co.—R. W. Corson, appointed asst. treasurer.

Allis - Chalmers Manufacturing Co.—M. M. York, named general manager, cement, mining & process depts.

Bethlehem Steel Co. — M. J. Pleuthner, appointed superintendent, Lackawanna plant, Fabricated Steel Construction Div.

Merkle-Korff Gear Co.—C. F. Rogier, appointed director of research and engineering.

Harnischfeger Corp.—P. R. Kiphart, appointed director, plant engineering services.

Continental Copper & Steel Industries, Inc. — F. J. Graziana, named corporate director of operations.

(Continued on P. 108)

W. B. Siegel, appointed vice president, personnel, Soulé Steel Co.

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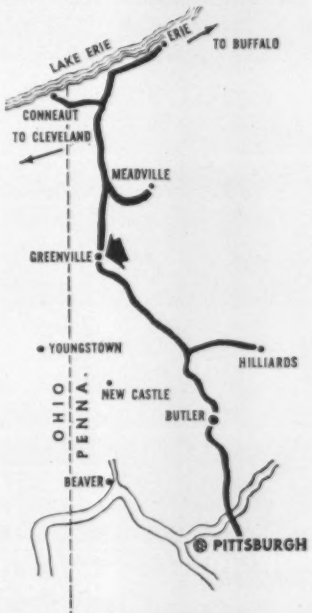

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(Continued from P. 107)

Ford Motor Co.—J. B. Lawson, appointed director, administrative and manufacturing staff, Aeronutronic Div.; Walter Johnson, appointed general manufacturing manager, Transmission & Chassis Div.

Emhart Manufacturing Co.—J. H. Taylor, appointed general manager, Portland, Conn., Div.

Avco Corp. — E. C. Carman, named director of marketing, Nashville Div.

McGill Manufacturing Co.—J. C. McGill, appointed asst. to general manager, Bearing Div.

Consolidated Electrodynamics Corp.—J. C. Ribbens, named manager, manufacturing engineering; A. P. Zacek, appointed manager of product design engineering; W. W. Frey, named material manager. All of Transducer Div.

Precision Steel Warehouse, Inc. —R. A. Goesswein, named works manager.

Tri Metal Works, Inc. — W. A. Deal, named general superintendent.

Rust Furnace Co.—F. A. Alexander, Jr., named asst. general manager; G. V. Prible, named chief engineer; F. H. Bricmont, named asst. chief engineer.

Republic Steel Corp. — W. W. Scheel, named asst. superintendent, South Div.; P. E. Van Winkle, appointed sales engineer, Culvert Div.

Jones & Laughlin Steel Corp.— Walter Batz, named senior research engineer.

Inland Steel Co.—M. M. Koontz, named manager, data processing services; E. R. Kenning, named resident sales representative, Kentucky and Tennessee.

Black & Decker Manufacturing Co. — C. M. Naylor, appointed transportation and warehouse manager.

Aeroquip Corp. — Matt Gatzweiler, named manager, planning and procurement, Jackson, Mich., plant.

American Bosch Arma Corp.— Hans Hogeman, appointed manager, engineering, American Bosch Div.

Anocut Engineering Co.—Arthur Heine, appointed manager, mechanical manufacturing.

Wheelabrator Corp.—R. C. Ochs, named chief accountant, Lord Chemical & Equipment Div.

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CLEVELAND — Production Tool Co.
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DETROIT — J. L. Bradford Associates
HACKENSACK — The Eaton Company
INDIANAPOLIS — Donald Meintire
MEMPHIS — Branch-Marvin Tool Specialties
MILWAUKEE — Ford Tool Company
MONTREAL — Humphrey B. Wolton
NEW HYDE PARK — The Eaton Company
NEW YORK CITY — J. V. Cremonin (Export)
PHILADELPHIA — General Tool Sales Co.
PHOENIX — DiEugenio Tool Center
PITTSBURGH — Ralph Esposito & Co.
PROVIDENCE — Fred J. McMillan
ROCHESTER — James O. Horne

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E. E. McGinley, appointed manager, operations for all plants, Phoenix Steel Corp.

R. C. Donovan, named works manager, Anaconda Metal Hose Div., Anaconda American Brass Co.

American Cyanamid Co.—J. S. Kennedy, named district metallurgist, explosives and mining chemicals dept.

Rolled Alloys, Inc.—W. J. Collins, named staff metallurgist.

American Industrial Leasing Co.—B. C. Firman, named manager, Pittsburgh office.

Westinghouse Electric Corp.—E. L. Laskin, named manager, manufacturing, Westing-Arc Dept.; L. E. Fry, joins Westing-Arc as sales engineer.

Taylor Fibre Co.—H. F. Gillespie, named chief industrial engineer.

Pratt & Whitney Co., Inc.—E. E. Kirkham, named manager, systems engineering section; H. W. Meyer, appointed manager, plans and technical section; M. H. Sluis, appointed manager, electrical design section.

Motorola, Inc.—A. G. Grimaila, appointed chief engineer for space technology, Western Center, Military Electronics Div.

Hooker Chemical Corp. — Ralph Macon, named project manager, international development, International Div.

Correction

Last week it was reported C. L. Squier had been appointed general manager, Lackawanna, N. Y., plant of Bethlehem Steel Co. Mr. Squier has been appointed an asst. general manager.

Barry Wright Corp.—D. D. Blair, appointed field engineer, Dallas.

American Air Filter Co., Inc.—T. R. Chambers, named training supervisor.

Aluminum Extrusions, Inc. — Robert Gossett, named plant engineer.

Allen Tool Corp.—P. E. Wheelock and Raymond Green, added to technical staff.

Spang & Co.—F. R. Brown, appointed chief purchasing agent.

Pacific Airmotive Corp.—E. V. Gardiner, appointed avionics manager, aircraft electronics.

Nichols Wire and Aluminum Co.—R. L. Kammer, named marketing manager, J. M. Morris, named executive vice president; and J. D. Case, named vice president, sales; L. G. Miller, named sales manager, Mill Div.

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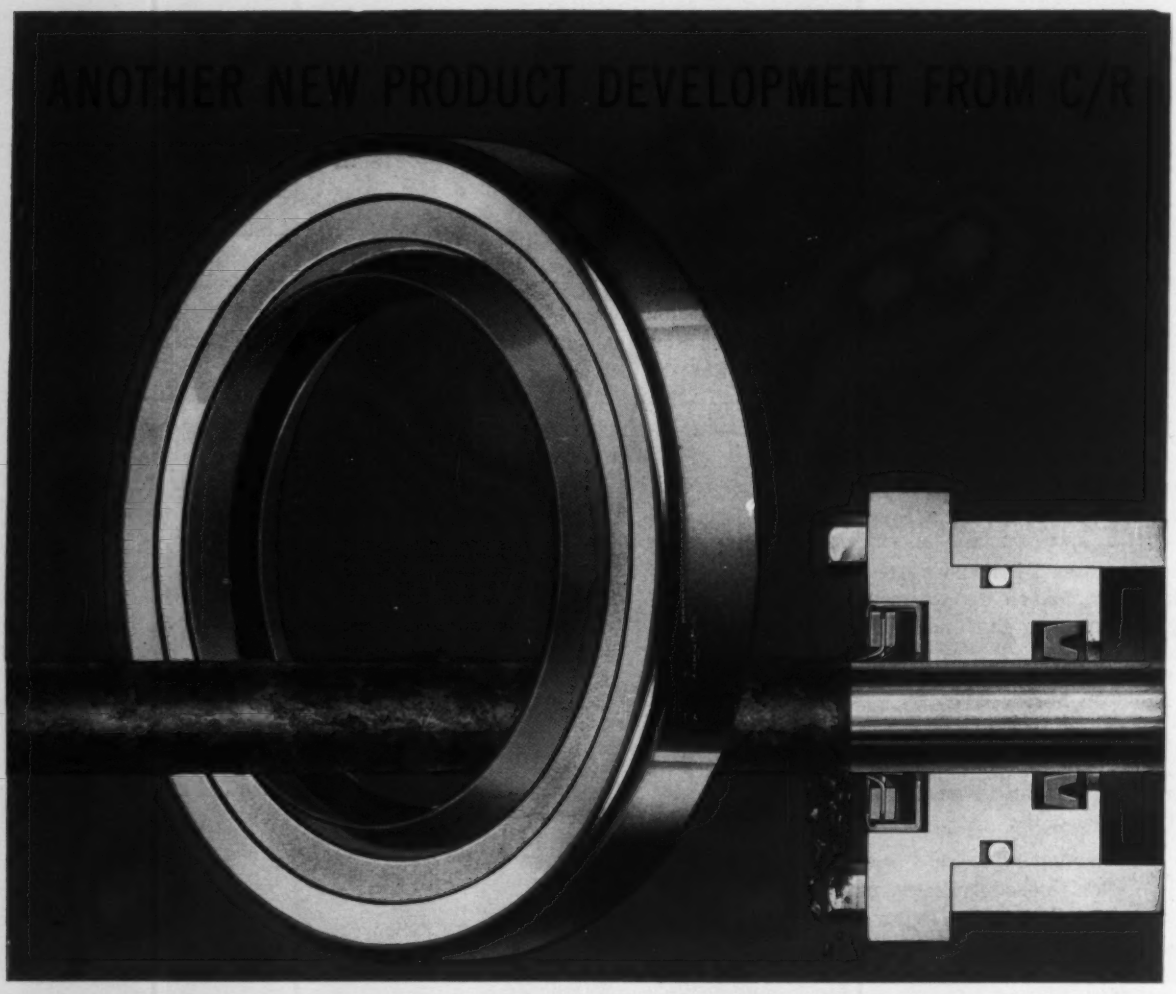

New Wiper-Scraper Seal for Cylinders

Scrapes off ice, mud, tar – wipes off water, dust, other contaminants

Now, you can effectively exclude dirt and other contaminants from hydraulic cylinders under the most severe field conditions. One compact unit, the C/R SC Wiper-Scraper Seal does the job. Formerly, a separate rod scraper had to be installed in front of the ordinary wiper seal. The special machining necessary, plus the scraper ring, and retaining ring made this an expensive installation.

Chicago Rawhide's SC Wiper-Scraper Seal combines a spring brass scraper and synthetic rubber wiping member in one steel shell. The I.D. of the scraper is slightly under shaft size to provide a snug fit that will remove tar or frozen mud, but it has sufficient play within the shell to tolerate any off-center conditions of the rod such as caused by bearing "bore-slop." The cost is much lower than any other combination of scraper and wiper. "Design-in" cost is low, assembly simple. Most important is the performance contribution to the cylinder. The additional value of longer packing life and increased operating dependability with the SC Wiper-Scraper Seal will far outweigh the nominal cost.

For complete information, specifications and standard sizes, write for your copy of C/R's new Bulletin SC-100

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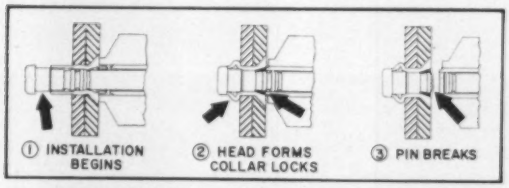
New High-Strength Bolt

A new alloy steel blind bolt with a shear strength of 95,000 psi has been introduced by Huck Mfg. Co. The fastener is designed to offer



TIGHT HOLD: Bolt checks vibration.

superior resistance to vibration in highly stressed aircraft, missile and weapons structures. The bolt has a collar that locks the fastener positively.

Back to Free Enterprise

The top Senate legislator will ask Congress to create a privately-owned $500 million satellite communications corporation. Oklahoma's Sen. Kerr, chairman of the Senate Space Committee, is expected to introduce a bill in the next session authorizing the FCC to determine which companies will share ownership in the U. S. portion of a world-wide satellite communication system. Under this bill rockets and launching devices would be purchased through NASA.

Instant Electricity

Batteries have been developed which will produce electricity instantly. They will operate on land, in the ocean's depths or in outer space. Developed at Aerojet-General, the batteries range in size from huge solid units to small, flexible devices no bigger than a piece of string. They work only in water and are made of zinc and silver chloride, held together by plastic.

Are Standards Adequate?

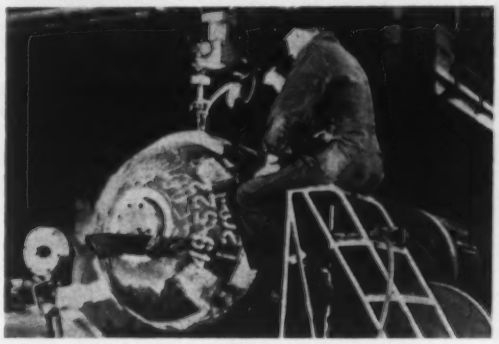
Air Force researchers have established statistical adequacy for a 0.95 confidence to support engineering designs and structural stress analyses for Type 410 castings. This applies to 0.10, 0.20 and 0.30 in. thickness. Current military X-ray acceptance standards for aircraft castings had been called inadequate. The standards have lacked correlation between strength and other properties and generally apply to castings with large cross-sections.

More Money for the Moon

Government money experts predict that NASA's budget, currently set at $1.7 billion, is likely to increase to $4 billion next year. The new budget will be geared to the moon project. Much of the money would go for rockets and satellites to land astronauts on the moon. The increased civilian space budget is in line with the administration's goal of world leadership in space. However, the new budget would work against plans for a balanced budget.

Storage for Gases

High-pressure vessels for storing gases at Atlas missile silos call for the highest strength welds ever produced on a production basis by the Foster Wheeler Corp. The vessels will store various gases for propellant loading systems. The welds,



GAS STORAGE: To supply the Atlas.

made by the submerged-arc method, are equal in strength and toughness to the T-1 steel base metal. Chemical changes to the weld deposit were made in the flux.

Structural Columbium

Commercially available columbium alloys have been fabricated into load-carrying components typical of current re-entry vehicle designs. These are among the findings cited by researchers at McDonnell Aircraft Co. Results also point out that such alloys, if properly coated, will withstand the temperatures to which space vehicles might be subjected.

Splashed steel can't damage these Ingot Mold Cars

These Ingot Mold Cars shed splashed molten metal like a duck sheds water. A one-piece rolled steel deck with long side skirts protects the bearings, springs and wheels. Every part is designed for long service—to keep the car on the job and out of the repair shop.

United States Steel has been *making and using* ingot mold cars for 40 years. We build them to stand rough treatment. The five features shown at the right make these 4-wheel, 55-ton-capacity cars a money-saving investment.

Our representative will be pleased to call at your convenience to discuss your requirements for this *or other types* of industrial cars. For more information, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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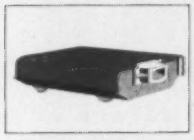
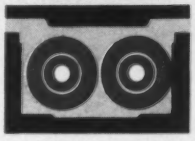
TRADEMARK

5 unique structural features make them better

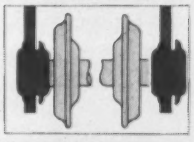


One-piece rolled steel deck with overhanging skirts protects bearings, springs and wheels from runover molten metal. Box construction is all-welded *rolled* plate.

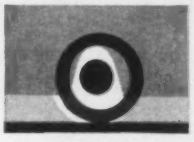
Engineered with safety factors: Designed for a 55-ton normal capacity load including ingots, molds and stools. Each car has a built-in safety factor of an additional 50% to withstand stripping thrusts.



Sixteen coil springs: Two heavy coil springs for each wheel—plus two overload coils inside these—provide a shock-absorbed level ride, so important in hauling molten metal.



Anti-friction outboard bearings: Located outside each of the car's four wheels to minimize sidesway and to provide long, smooth-running performance.



Multiple wear wheels: Forged steel wheels give several times the wear of cast wheels—save many a trip to the repair shop.

Computer Enters Hot-Strip Mill To Step Up Yield and Quality

By **W. E. Miller**—Mgr., Metal Rolling Application Engr. Operation, General Electric Co., Schenectady

How far away is the fully-automated steel plant? It may be just around the corner.

Computers already feed blast furnaces and control strip processing lines. Now they're slated to automate hot mills.

■ Off-gage thicknesses at the start of an order run and at the end of a coil create waste in hot-strip rolling mills. However, this waste will soon be curbed. Computer-controlled hot-strip mills, now in the works, will upgrade operating practices and automatically control finished strip thicknesses.

Each computer will handle all mill setups, data logging and processing, and production scheduling. Other features of the new hot-strip mills include: automated looper operation; programmed drive speeds; automated gaging; and fully-programmed roll-opening positioners.

Gage Buildups—There are three main causes of off-gage stock in a hot-strip mill. First, temperature rundown from a slab's head to its tail causes a gradual buildup in gage. As it cools, the strip becomes harder to form. Thus it ends up thicker near the tail section.

Another reason for off-gage stock centers on cold spots in the slab. Water-cooled skids in the reheat furnaces are the culprits that produce these cold spots. Then, as the hard-to-shape cold spots pass through a multi-stand mill, they cause gage buildups.

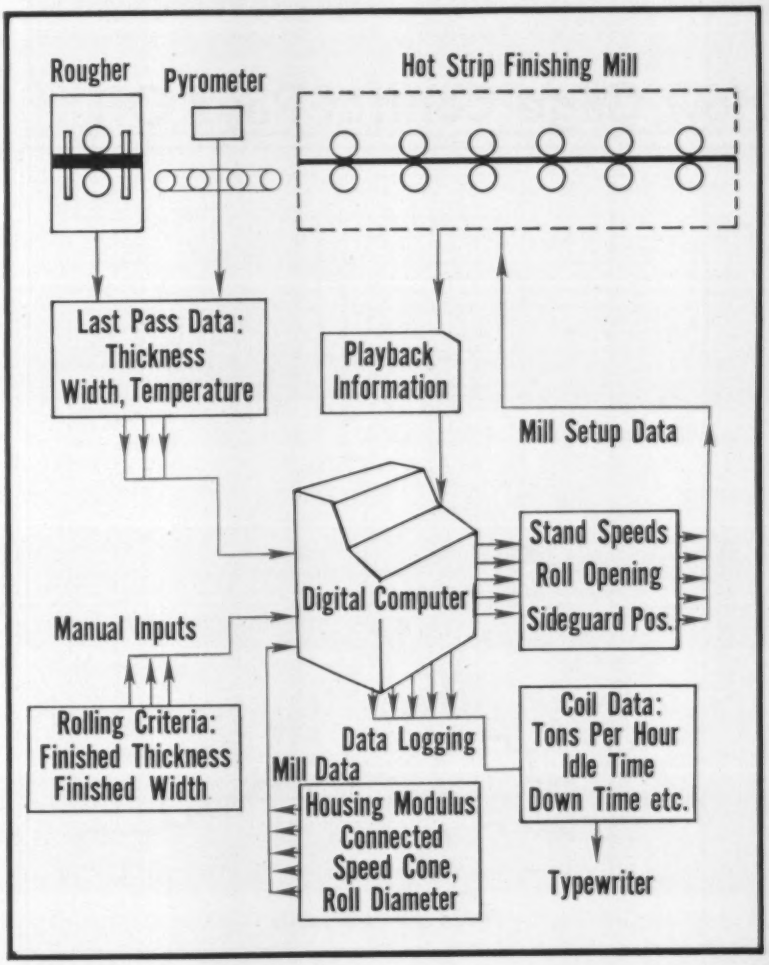
The third factor behind gage variations hinges on loss of tension as each strip's tail leaves the initial rolling stands.

Interstand Tension—To improve tail-end gage, the new mill will operate with low tension between the stands. When this tension is lost, there'll be very little tail-end gage buildup.

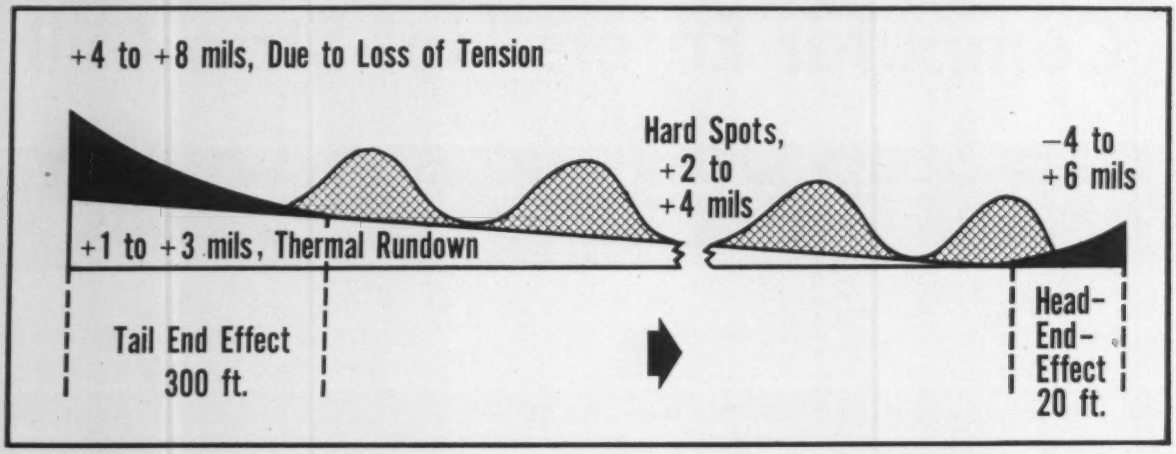
Here's why. Automatic loopers will insure constant interstand tension. Along with curbing tail-end waste, they'll help to maintain constant strip widths.

This use of loopers brings about a major change in practice for most mills. Only a few hot-strip mills

Computer Logs Strip Records



Check the Causes Behind Off-Gage Strip


+4 to +8 mils, Due to Loss of Tension
Hard Spots, +2 to +4 mils
−4 to +6 mils
+1 to +3 mils, Thermal Rundown
Tail End Effect 300 ft.
Head-End-Effect 20 ft.

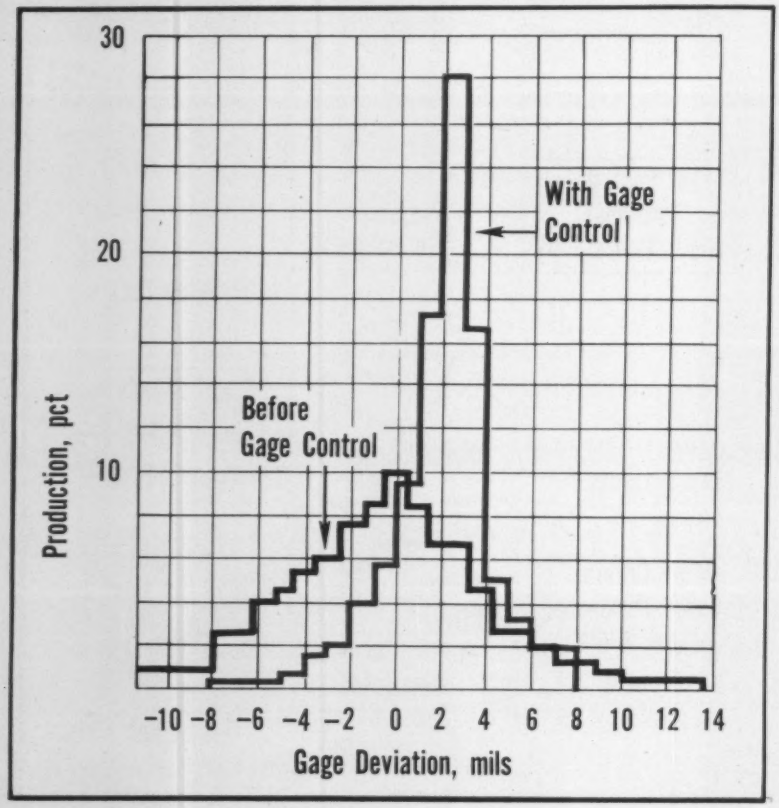
ever operate with the loopers up. Now, there's a trend toward more effective looper control.

Some steelmen prefer to roll with high tension. They claim this improves the strip's shape. Perhaps it does to a small degree, especially as the rolls wear or heat nonuniformly.

When they're pressed, most of these steelmen admit a bigger reason for not raising and lowering the loopers. In the past, loopers were too troublesome to adjust at frequent intervals. Poor mechanical and electrical designs are behind most of this looper sluggishness.

Also, without automatic speed regulators and programmed gage control, a hot-strip mill operator was in no position to control the loopers. He would have gone around in circles trimming motor speeds and trying to hold the loop constant.

How Gage Control Pays Off



Uniform Gage—Effective gage-control systems already serve in some hot-strip mills. They monitor a strip's thickness as it emerges from several in-line rolling stands. Adjustments are effected through screwdown drives.

Long slabs have greater temperature variations than short slabs. Thus they require more screwdown control stands. The spacing between the slabs also dictates the number of screwdown stands needed. If this spacing is short—two seconds or less between slabs — numerous screwdown control stands are a must.

Automatic gage control eliminates the "grow-back" problem which crops up due to the cooling of the slab's tail end as it waits to be rolled. Gage control also varies rolling pressures. This compensates for the hardness variations introduced by cold spots in the slabs.

Most hot-rolled strip undergoes further reduction in cold-rolling mills. Therefore, from a production-

balance viewpoint, it pays to hold gage tolerances on the plus side.

Whenever automatic gage regulators enter a hot-strip mill, thickness deviations tumble. The third illustration proves the importance of automatic gage control.

With gage control, one mill reports a 95-pct improvement between ±2 mils and more than four-to-one reduction in strip thickness beyond ±4 mils. Other mills report similar results.

Computer Control — Now, let's see how a computer enhances gage and production controls. Basic input data for the computer-control system which is now being installed include: Steel grade, desired delivery speed and desired gage.

Other input data, automatically tabulated, pin down the physical traits of each incoming slab. These traits include thickness, width and temperature.

Using a stored program, the computer makes all necessary calculations. It derives the optimum speed, screw setting and roll-separating force for every stand. These calculated data serve as references for the gage control, main drive and auxiliary-drive regulating loops.

If desired, the computer will perform other functions. It can program the entire strip mill from the reheat furnaces to the coil conveyors. Thus, slabs can be automatically tracked from the time they enter the furnaces until they emerge as completed coils.

Keep It Hot—All reheat furnaces also come under the digital computer's control. The computer insures proper slab heating while saving on fuel. It also regulates each furnace's fuel pressure and fuel-to-air ratio.

As each slab moves through the mill, the computer will position the sideguards, set all thicknesses and width gages and regulate the roll openings and drive speeds. While making these adjustments, the computer will also be logging data for the production-control and accounting departments.

Coil coding, total footage, and off-gage and off-width footage records will be typed out on a preprinted format. Total and running tonnage counts plus all downtime records will be stored in memory drums. This information will be typed out on demand.

Step by Step — Hot-strip mill automation is profitable. Payoff periods are short. Depending on the extent of automation, a computer-controlled mill should pay for itself in three years or less.

Every case should be studied separately to decide how far you should automate. With a step-by-step plan, you can automate one process, then another. These modular steps are commonly called islands of automation.

If several automated areas are tied together, you can obtain a fully-automated steel plant. In such a system, the hot-strip mill's computer "talks" with other area computers and with a central computer.

Match Need—The central computer integrates output from automated blast furnaces to mesh with production demands from the rolling mills.

Integrated automation represents the combination of some or all functions of engineering, production planning, operations, accounting and marketing. With relative simplicity, it insures optimum economy.

In hot-strip mills, automation will counter ever-rising production expenses. Steel users will also know that strip is being produced to tighter tolerances. They'll measure their savings in longer die life and lower assembly costs.

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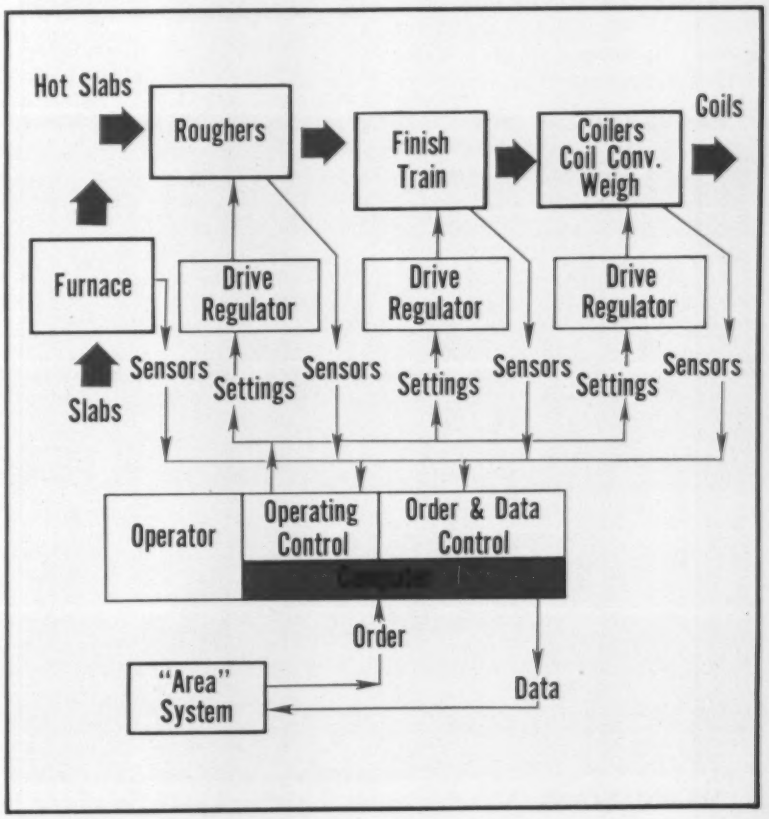
Why Not Use Island Concept?



Molded Fiber Glass Pays Off On Large Complex Shapes

Fiber-glass reinforced plastics are serving in more and more automotive plants.

All of the major automakers will use rust resistant fiber glass to boost power-to-weight ratios on some '62 models.

■ With every major automaker using fiber-glass reinforced plastics in 1962 models, auto-body engineers are in a position to move ahead. They can plan more imaginative uses for these modern materials. And they can base their plans on a mass of dependable performance data.

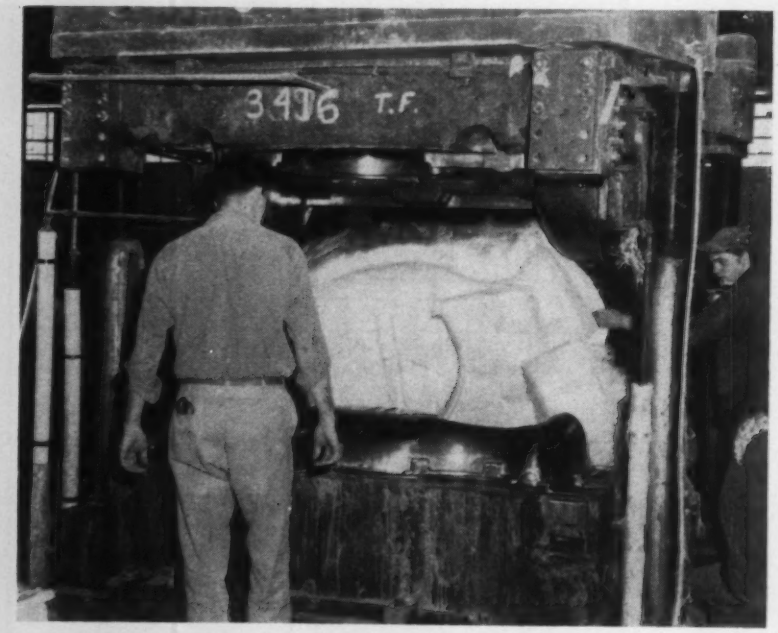
There are three major areas—all perennial problems — where fiber-glass reinforced plastics offer auto- and truck-body engineers impressive results. These areas are cost, styling and performance.

Easy to Draw — High styling, compound curvatures, and elaborate details can be achieved in molded fiber glass. There's no limitation on deep draws. Using matched metal dies, it's possible to produce parts to a tolerance of ±0.010 in.

Yet the cost of matched metal dies for fiber-glass plastic parts is one-tenth to one-fourth the cost of dies for steel. This cost advantage is greatest when a steel part requires several hard-surfaced dies to blank, strike, re-strike, and trim.

The one-piece underbody for the Corvette is a huge molding. It runs the full length and width of the car. With complex curves, it's 30½-in. deep.

In a secondary operation, 150 holes—some with diameters of 3-4 in.—are automatically drilled in this part in a matter of minutes. All tooling, including the molding dies and tools for the secondary operation, cost only about $75,000.



SECOND STAGE: After the preform is made, it's placed in a mold.

Tool-Up Time — Mr L. L. Palmer, manager of Automotive Sales, Molded Fiber Glass Co.'s, Ashtabula, O., states: "Tooling for molded fiber-glass parts saves time as well as money. Medium-large complex parts can be tooled in about 12-14 weeks. A large underbody takes only 22-30 weeks. Dividends in time and cost really pay off on parts that require major change-overs from year to year."

Low mold costs yield the greatest per-piece savings when a production run is relatively low. Molded fiber glass should always be considered when the number of pieces needed is between 500 and 25,000.

Considerations of both volume and quality made it a natural choice for the Lincoln Continental and the Cadillac 75. These cars have fiber-glass plastic for inside trim panels. Production is relatively low. Therefore, tool costs are important even though the models usually run for a three-year period.

There's no compromise with quality in these luxury cars. All panels must meet a high standard of impact resistance. The strength of molded fiber glass permits standard methods of attaching the panels to a car's body.

Diesel Tractor — In designing a diesel tractor, Ford engineers added several panels and a grille to the raised cab. Faced with the problem of low production which is prevalent in diesel trucks, Ford chose fiber-glass reinforced plastic. Why? Because tooling for these parts in steel would have been prohibitive.

Another reinforced plastic part added to the tractor was a sleeper. It blends into the body and looks like part of the cab. If steel or aluminum had been used, the sleeper wouldn't have smooth-flowing lines. Finally, the old wheelhouse area

was fitted with a molded fiber-glass storage compartment and dust-tight door.

In this era of compact cars, weight savings are of prime importance. Fiber-glass reinforced plastic is 40 pct lighter than steel. Twenty-gage steel weighs 1.5 lbs per sq ft. Fiber-glass plastic, that's 0.1-in. thick and meets auto specs weighs 0.875 lb per sq ft.

Molded fiber glass on the Corvette body saves 300 lb. It also yields a better power-to-weight ratio for this sports car.

Light Mass—A total of thirty-four fiber-glass parts serve in the White 5000 tractor cab. These parts weigh in at less than 260 lb.

Rust and corrosion are the chief destroyers of auto and truck bodies. Thus, rust-proof fiber-glass plastic increases in value with the vulnerability of a part.

The first Corvette is still in service. Its body is in perfect condition after eight years and 150,000 miles.

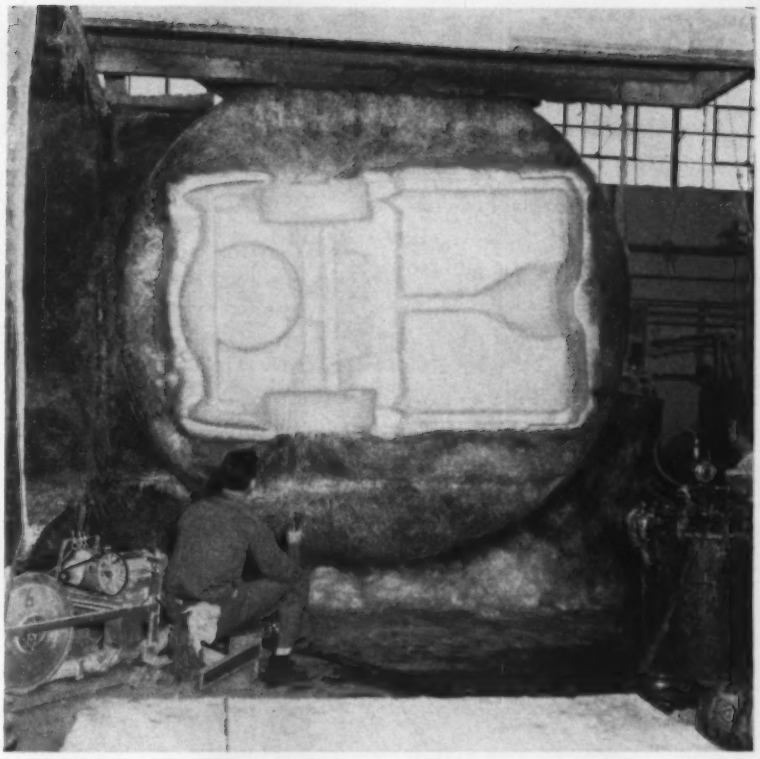
There are White 5000 cabs which have been driven more than 500,000 miles. Like the Corvette, these tractor-cab bodies will be around for quite some time.

Good Strength — All the parts discussed are fiber-glass reinforced plastic, produced in matched metal dies under high heat and hydraulic pressure. Either preformed fiber glass or chopped strand mats are used in making these parts. Automakers specify a minimum tensile strength of 16,000 psi.

Most physical properties of fiber-glass reinforced plastic hinge on the glass content. For auto applications, 40-pct glass by weight is recommended. For some parts, specs call for 45-50 pct glass.

Generally, 40 pct is preferred because of surface-finish needs. Beyond 40 pct, the glass-fiber pattern becomes a problem. Some processes run as low as 25- to 30-pct glass.

There is no practical limit on size of these molded parts. Seventeen-foot boats and one-piece Corvette underbodies are now being molded. When larger parts are designed, larger presses will be built.



INITIAL STEP: The first step in diemolding a Chevrolet Corvette's underbody centers on the making of a fiber-glass polyester preform.

SATURATES PREFORM: Underbody takes shape as a metered amount of resin pours into the pattern. Output is about 200 parts per shift.

Profile Welder Builds Beams

New machine makes structural shapes from steel plate.

It produces various size sections as needed. Costs are lower than with hand welding; inventory charges can be reduced.

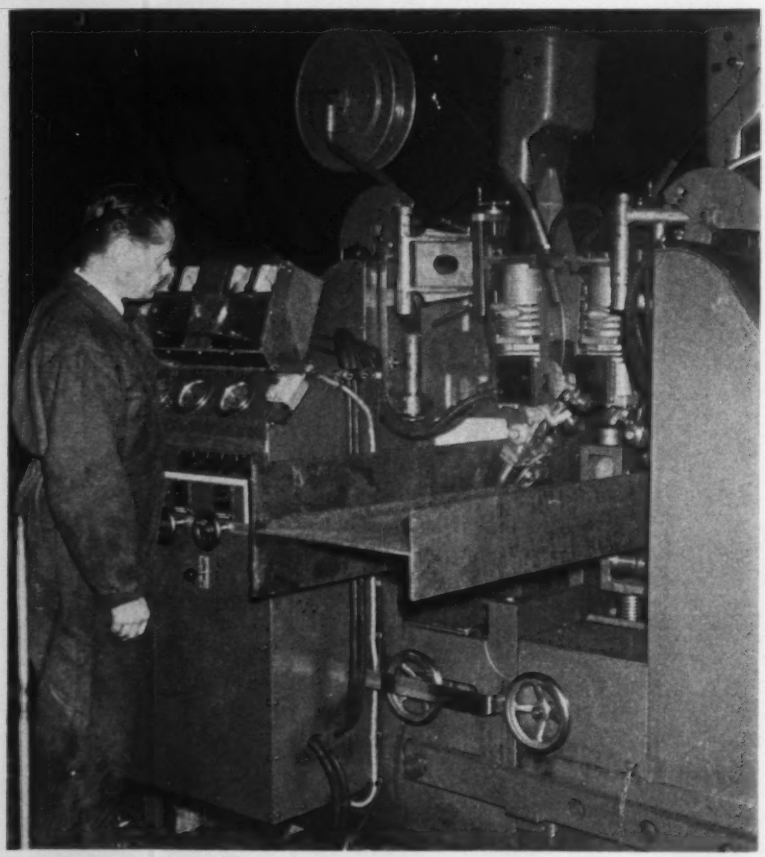
■ One of Sweden's largest structural steel fabricators is using a new type of profile welder to produce special sections, as well as to cut costs on standard shapes. The company has also reduced inventory costs by buying plate in large sizes and cutting it as needed.

Beams, channels and profiles have been welded by hand for years. And some steel fabricators have designed fixtures for special welding of such shapes.

Saves Money—But the Stockholm fabricator uses a machine designed especially for fast welding of I-profiles, T's and special shapes, at savings as much as 40 pct.

The machine was built by Pullmax AB, Gothenburg, Sweden. It is designed for continuous welding, has automatic steel-plate feed and two submerged-arc welding heads. Production speed ranges up to 5½ fpm.

Designers sometimes find that the most efficient beam size is either not made at all, or is on a long-delivery basis. This was in part the reason why the automatic welding machine was purchased; it proved less expensive than hand welding.



TWO FLANGES AT ONCE: Two flanges, 8 and 12 in., respectively, are welded simultaneously. Welded I-beam has a web height of 26 in.

Save on Stock—Also, the fabricator, which bought up the first of a number of these units, reports savings on steel costs by purchase of 10 x 40-ft plate from the mill and cutting to size in multiple oxygen flame-cutting machines. The unit is now averaging 50 tons of welded shapes a week on one shift.

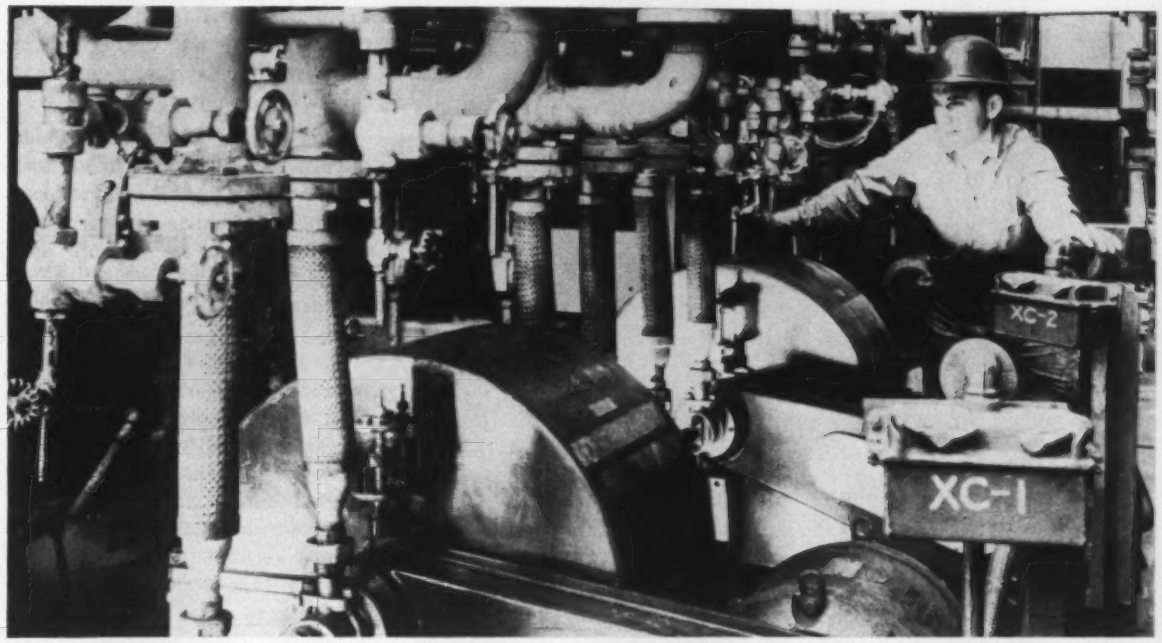
The cost picture is interesting. In some fairly typical cases a saving of 25 pct is possible; in extreme cases the savings have run up to 40 pct.

Meets Requirements—The profile welder will fabricate I-beams with a maximum height of 60 in., a maximum flange width of 20 in. Minimum height is 12 in.; minimum flange is 2 in. Within these dimensions, various shapes are possible. It can also be used for butt welding. Shifting the machine from one size beam to another takes about an hour.

The machine is normally fitted with two 900 amp constant voltage dc units for submerged-arc welding of carbon steel. In welding beams of other materials like stainless steel, as well as for automatic welding of small sections, the CO_2 shielded arc method might have some advantages.

Hand welded beams have a tendency to show peak stresses because of the usual practice of tack welding them. A continuous machine avoids these local stress points, because no tack welding is needed in the setup.

Welding codes in most European countries approve of welded structural beams for all purposes and load conditions. Fillet welds are permitted in all cases where loads are static. Some countries require butt welding for dynamic loading conditions. Since the Pullmax machine can produce butt welds between flange and web, this presents no problem to the user.



OIL REFINERY: Stainless pipe connector at oil refinery keeps solvent extractor in continuous operation.

Where to Install Metal Hose

By **J. Duenes**—General Manager, Allied Metal Hose Co., Long Island City, N. Y.

Look around most metalworking plants and you'll find dozens of places where lengths of flexible metal hose should be installed.

Once you locate the targets, observe the rules of installation.

■ It's surprising how many applications there are in the average plant for lengths of flexible metal hose. The jobs all center around piping systems where vibration, relative motion between equipment and pipe, or temperature fluctuations are involved.

Essentially, flexible metal hose consists of corrugated tubing. The tubing gets added strength from a woven wire outerbraid. Designed to bend repeatedly like a hose, these pipe connectors achieve their flexibility from a continuous series of closely spaced corrugations formed in seamless-type pressure tubing. This assists design.

When this product is used in relatively short lengths, it's called a connector. The longer sections are referred to as hose or flex tubing. Under internal pressure, corrugations tend to straighten out, thereby lengthening the tubing. To overcome this, wire braid covers the tubing. Anchored at both ends, the braid bends with the tubing.

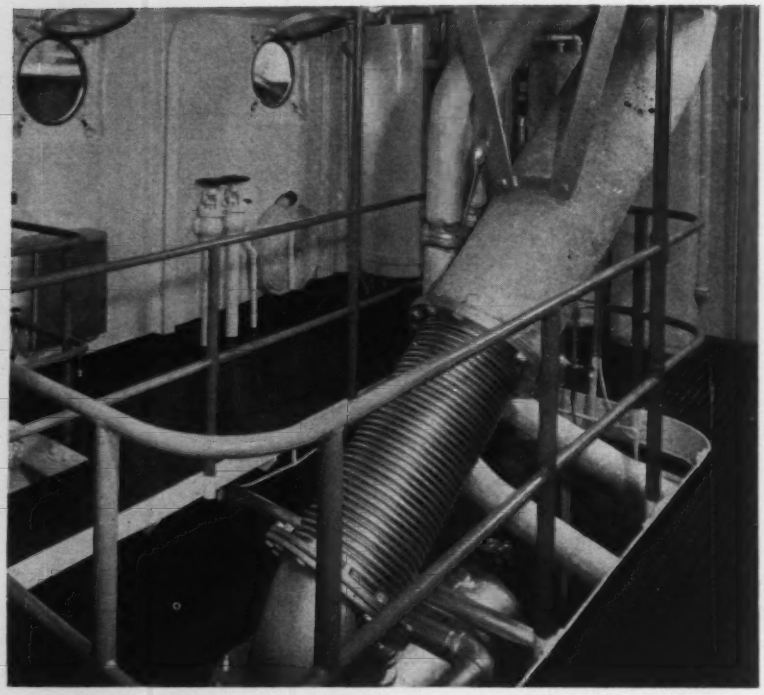
The product is available in a variety of metals including stainless, Monel, carbon steel and bronze. It's also available in most of the common pipe sizes up to 16 in. Normally the braid is made of the same material as the tubing, but this can be varied.

Stress Absorption—Flexible metal hose is designed to absorb stresses in piping. As a result, the stresses are not transmitted elsewhere. The flexible sections are also useful for carrying industrial fluids that cannot be handled by rubber hose.

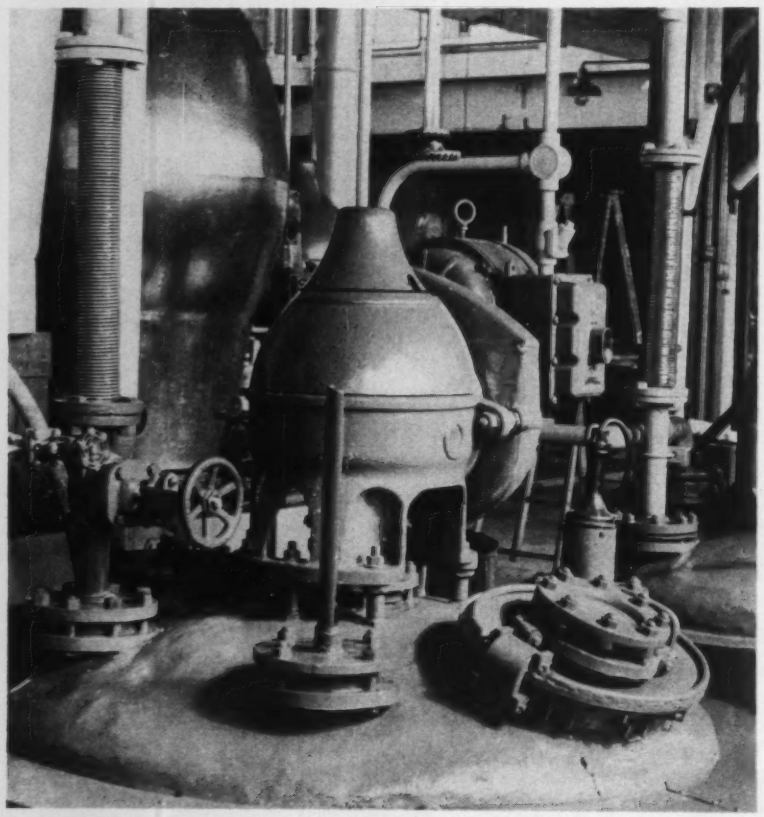
Such metal connections are intended to eliminate certain difficulties. Included here are problems caused by high temperatures, corrosive fluids, vibration, temperature fluctuation, relative motion, pipeline misalignment and space limitations.

Here are a few examples of intended jobs. First, there are the supply lines which bring compressed air or gas to desired locations. In cleaning and pickling setups, you have the acid and caustic lines. How about the high-pressure, forced-feed lubrication supply to equipment at high temperatures where movement and positioning are involved?

Other targets are hydraulic and pneumatic brake and coupler lines in mill rail cars or molten-metal transfer cars; additive gas supply to high-purity electric and vacuum-melt furnaces; and high-pressure



DAMPENS VIBRATIONS: In exhaust line of Diesel engine, the flexible metal connector prevents transmission of vibrations to harbor boat.



MIXING TANK: One duty of connector in steam supply line of steam-jacketed mixing tank is the compensation for temperature fluctuations.

steam conveyors for quenching of metals. There are also vibration absorbers on compressors and offset connectors on pumps.

Won't Work Everywhere—Quite often, however, a connector or hose is called upon to do a job it's not designed to handle. Common misuses include flexing in more than one plane or excessive bending.

If you want a connector to work right, install it correctly. There are a number of rules which should be followed in regard to installation. First, never compress a flexible connector to make it fit. If you do, you'll just be limiting further compressive movement. Measure carefully before ordering. Install at exact normal length.

Don't force-rotate one end of the connector to match bolt holes in the mating flange. Instead, be sure all bolt holes are lined up before welding the pipe flange into place. Better yet, use one floating flange.

Don't Stretch—Stretching a connector past its factory-furnished length can lead to early rupture. Installation at exact normal length, once again, will avoid such a situation. Always use two wrenches to prevent torque as the joint is made up. Never use a wrench on the ferrule or the braid.

Anchor the flexible section securely at the piping end, never at the equipment end. Insecurely anchored, the hose will transmit vibrations to the piping system. Don't put valves between the hose and the equipment. If you can, install the connector directly to the vibrating equipment. There, it will absorb and isolate most of the vibration.

Carries Its Weight—The thin wall of a connector is designed to withstand internal pressure, not to carry external loads. For this reason, it should support only its own weight.

Whenever you exceed the maximum permissible lateral offset, you place the connector under great strain. Restrict motion to a single plane. Never bend hose sharply near the fittings. The fitting end or flange face must always be perpendicular to the axis of the hose.

New Alloy Generates More Power

Thermoelectric generators may find their way into plants sooner than expected.

Researchers put together a new alloy that kicks up efficiency to a competitive level.

■ A new germanium-silicon alloy produces electricity when it's heated to a high enough temperature. The thermoelectric material provides a very high current rate—higher in fact than any known metal combination to date, say researchers at Radio Corp. of America, Princeton, N. J.

A generator, using a plate-like arrangement of the new alloy, with a square foot surface heated to 1800°F could put out up to 10 kw. This is nearly three times the amount consumed at any given time in the average home.

Finds Quick Use—The new material is expected to see important military action. It was developed in a research program which was started and largely sponsored by U. S. Navy's Bureau of Ships.

The germanium-silicon alloy opens the way to a full range of compact and self-contained generators. They can use high-temperature nuclear heat sources to power equipment in space. The generators can also use solar energy to furnish electricity in deserts or tropics.

"Such generators," says RCA's Dr. James Hillier, "can serve many defense needs. But just as important, we can begin now to think of silent thermoelectric generators, without moving parts, to power outboard motors and other machinery in everyday use."

Power Checks—The new alloy was tested in units measuring only ¼ x ¼ x ½ in. Each such unit produces nearly 3 w by conversion from heat sources near 1000°F. The scientists were out to obtain the most precise measurements yet made of heat flow in semiconductor materials of which germanium and silicon are familiar examples.

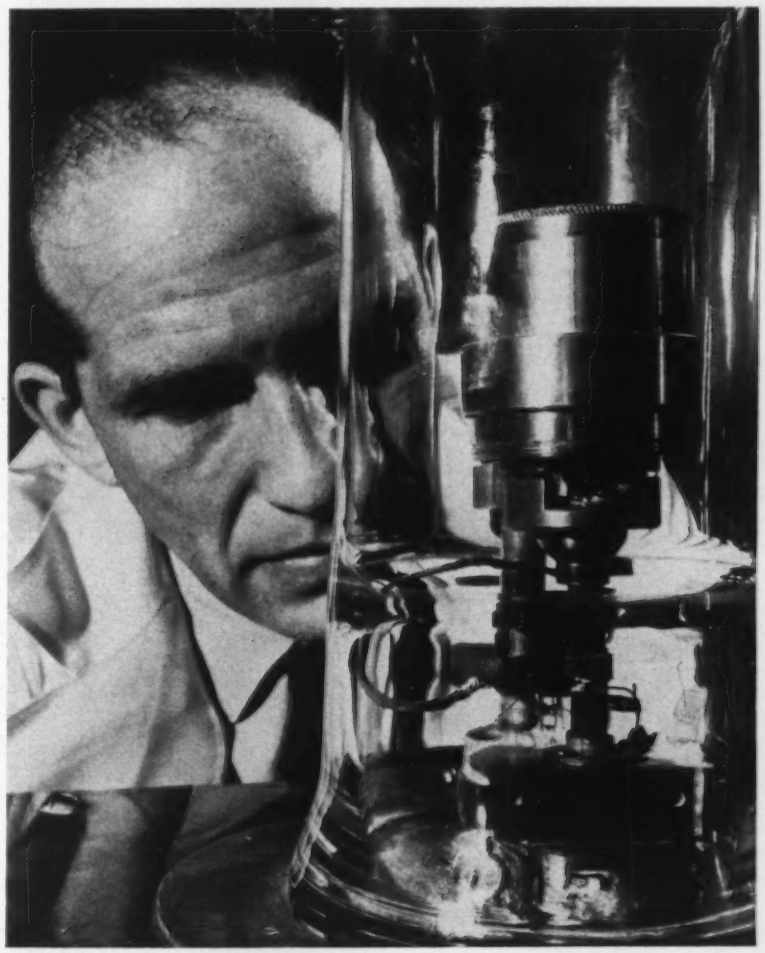
These studies showed that the germanium-silicon alloy has far lower heat conductivity at high temperatures than had been expected on the basis of existing scientific theory.

According to the scientists, lower heat conductivity means higher operating efficiency. A higher percentage of the heat is put to work within the material rather than being uselessly dissipated.

Longer Life—The new alloy is extremely stable—even in the high temperature range up to 1000°F. This stability means that much longer operating life can be expected than with other materials.

"By arranging the new alloy in layers, along with the earlier lower-temperature materials, we take advantage of their peak performances at different temperatures. Thus, we can look forward to thermoelectric generators that can operate from many heat sources at efficiencies exceeding 15 pct," says laboratory director, Dr. F. D. Rosi.

"At this level, thermoelectric units can become functionally competitive with conventional packaged-power sources."



GOOD SHOW: Germanium-silicon alloy, a new high-performance material converts heat to electrical power—up to 10 kw from 1800°F.

Aluminum Casting Processes Vie for Automotive Jobs

Choice of a particular aluminum casting process depends on many factors.

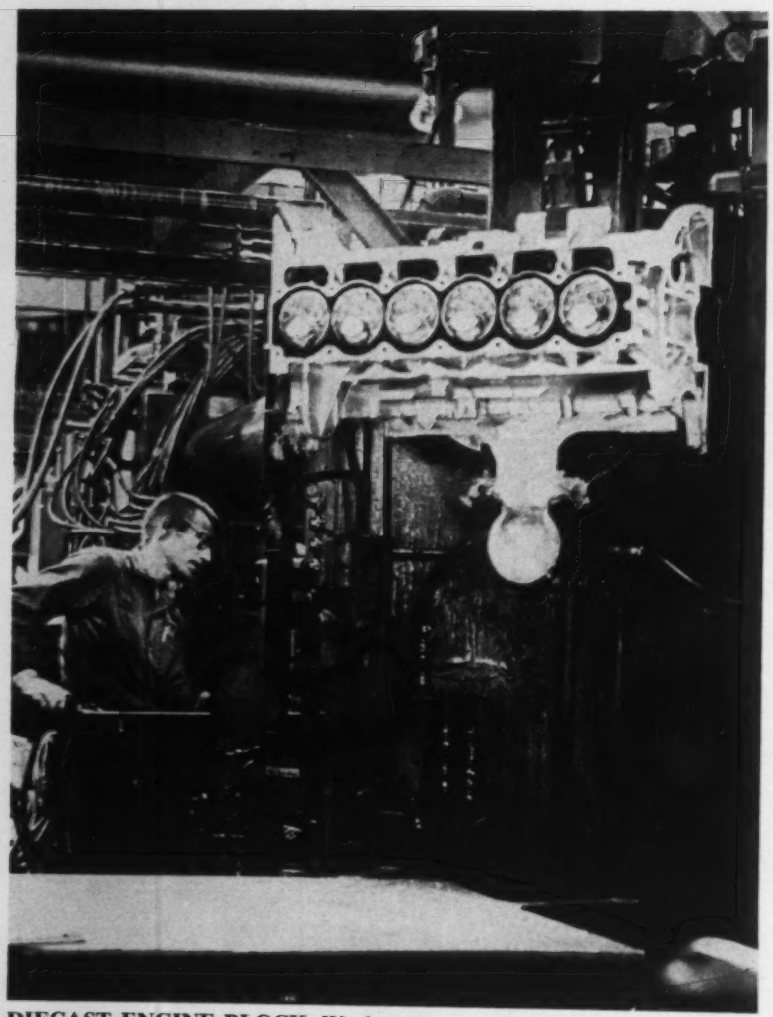
How are the automotive manufacturers putting these processes to work?

By **R. H. Eshelman**
Machinery Editor

■ The aluminum casting industry has made impressive gains within recent years.

Development of aluminum-casting technology is growing rapidly. Boosting their capabilities are: New controls; improved machines and processing methods; mechanical- and automatic-handling techniques.

Some results: Bi-metallic parts are now produced; sand castings have improved tolerances; castings' strengths are higher.



DIECAST ENGINE BLOCK: Worker prepares die for next batch of molten metal as six-cylinder engine block emerges from diecasting machine.

Where's the Payoff?—To get the greatest payoff from aluminum, you must also be prepared to take advantage of the most efficient casting technique. However, with new techniques moving ahead in each field of casting, there's no ready answer as to which may be best. Each part and situation must be studied separately. And the factors can change.

Since sand casting is one of the most flexible processes, tooling costs and lead time are at a minimum. In the past, the big objection to sand casting's "bang, jolt and squeeze" molding has been the poor tolerances. This has changed.

Foundry sands are better; cores which require no baking can be produced with CO_2-type binders; epoxy-resin patterns are being used to make improved molds.

High Volume, Also—Contrary to general belief, both low-cost and high-volume production are entirely possible by sand casting. Use of mechanized handling and fast, modern foundry equipment have opened new avenues. Consider this example of the wedding of sand casting's flexibility with high volume.

The part is an aluminum intake manifold for V-8 engines. This complex design features many internal passages. Early in the product design, various casting methods were explored by the Bedford plant at GM's Central Foundry Div. Extensive prototype work trimmed them to two: Sand or permanent mold.

Consideration of design facilities, lead-time factors, and tooling costs funneled the job into the sand casting route.

Conveyor Assist—A special mixture of urea-formaldehyde-bonded

sand is used to make the cores which are blown in automatic machines. Two impression green-sand molds are produced on semi-automatic, jolt-squeezing molding machines. Cores are set and molds closed on a moving conveyor. Conveyors are also used to carry the molds to pouring, cooling and trimming operations.

Pattern changes on the line are made in 30 minutes. Any combination of two different manifolds can be run.

Semi-Permanent Mold — On the other hand, the semi-permanent-mold process affords outstanding advantages for some jobs, points out Central Foundry Div.'s production-engineering expert, John Lapin.

Advantages include: Expendable sand cores which provide complex internal shapes; the metal outer mold that produces 100,000 or more pieces.

Aluminum V-8 cylinder blocks and heads are made by this technique. Flexibility of the process allows production of such blocks with cast-in liners in a closed deck design. Plant studies showed other casting techniques to be less feasible for this job.

JOLT AND SQUEEZE: Intake manifold for V-8 engine is made by sand casting. Molds are made on semi-automatic jolt squeezing machines.

Another Process — Permanent-mold casting is still very much in the picture. It pays off when turning out a large number of castings. There's little maintenance except for periodic repair of the mold surface coating.

This process is currently being used to make large numbers of aluminum pistons. One example pointing up its advantages is a bi-metallic brake drum which consists of a machined liner which is metallurgically bonded in casting to a finned-aluminum outer drum.

Again, mechanized handling cuts production time and costs in this operation at Central Foundry's Bedford plant. Horizontal metal molds ride on a multiple station ring-around. Closing and opening of the molds, and ejection of castings are by cam action.

Machined cast-iron liners go by conveyor through a bath of pure aluminum at 1300°F. This imparts an intermetallic compound of iron-aluminum to the surface for bonding. Next the liners are loaded on the lower drag portion of the horizontal mold. The mold is closed, and the metal poured. Not more than 30 seconds elapses between removal of the cast-iron part from the bath to filling the mold with aluminum. This assures a good metallurgical bond.

How About Die Casting?—Both Chrysler Corp. and American Mo-

How Casting Processes Rate

COMPARATIVE RATINGS OF CASTING PROCESSES FOR ALUMINUM

Factor	Sand	Permanent Mold		Die Casting
		Semi	Full	
Design Flexibility	1	2	3	4
Tooling Cost	1	2-3	2-3	4
Capital Investment	1	2	2	3
Tolerances	4	3	2	1
Turnaround Factor and Lead Time	1	2	3	4
Metal Content	4	2-3	2-3	1
Labor Content	4	3	2	1
Surface Finish	4	3	2	1
Assembly Cost	4	3	3	1

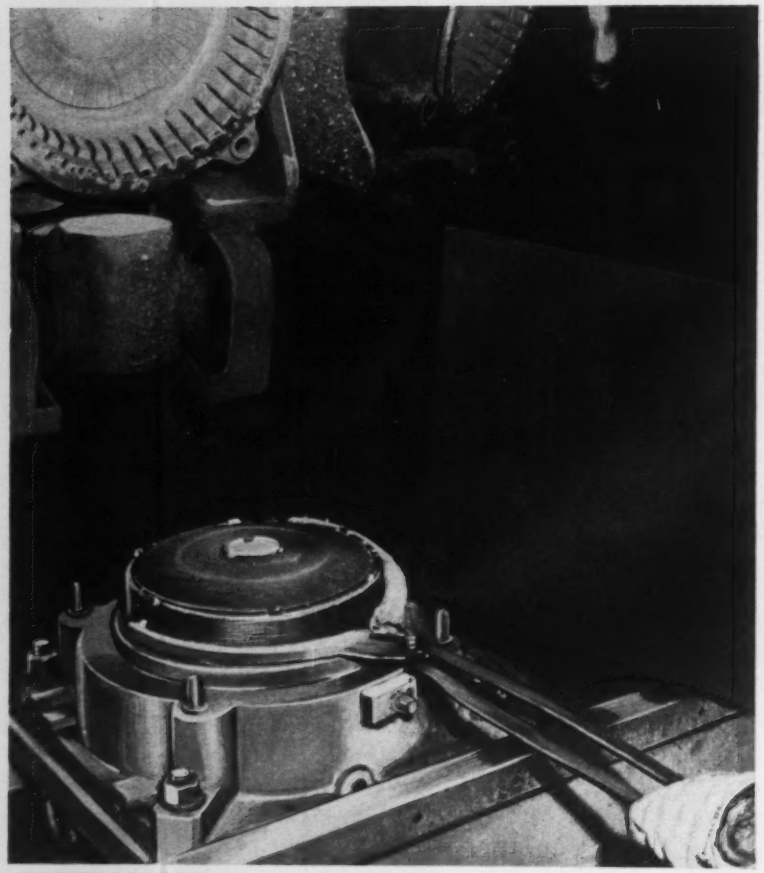
Central Foundry Div., GM

Standards vs. Casting Process

DESIGN AND TOLERANCE STANDARDS—ALUMINUM CASTINGS

		Sand	Permanent Mold	Die Casting
Linear Tolerance	5 in.	±0.030	±0.016	±0.008
	12 in.	±0.045	±0.030	±0.015
	18 in.	±0.060	±0.045	±0.018
Possible Parting Line Separation or Shift		+0.045	+0.030	+0.015
Finish Stock	5 in.	0.090	0.060	0.020
	12 in.	0.120	0.090	0.030
	18 in.	0.180	0.120	0.040
Wall Thickness Normal Minimum		0.180	0.160	0.090
Normal Maximum		No Limit	0.600	0.280
Maximum Ratio Thickest to Thinnest Portion of Casting		No Limit	3.5/1	2.5/1
Desirable Draft		2°	5°	1°
Minimum Diameter of Cored Holes		0.500	0.250	0.140

Central Foundry Div., GM



BI-METALLIC DRUM: Cast-iron liner is closed in permanent mold prior to pouring of aluminum periphery. Result: A bi-metallic brake drum.

tors are having success with die casting in-line, six-cylinder blocks in quantity production.

Chrysler's aluminum die-casting plant at Kokomo, Ind., for example, shipped 34,000 cast-aluminum parts last year. This includes about 12,000 engine blocks—a figure which is expected to be stepped up substantially this model year.

The big payoff in die casting is its high production rate. It's considered double that of comparable permanent-mold processes. Yet the nature of the process makes it susceptible to design difficulties.

Unless product design can be integrated with production requirements, the payoff will be lost. For minimum cost of sound parts, you must follow definite rules: 1) uniform section thickness; 2) simplicity of parting lines; 3) simplicity of coring; 4) provision for easy trimming.

Consider All Costs—In comparing aluminum parts with previous ones, you must consider the finished part cost, not just the raw casting cost, warns Harry Erikson, plant manager at the Kokomo plant.

At the pouring spout, the cost of aluminum per pound is considerably more than that of cast iron, he notes. But this cost penalty is offset somewhat due to the lower weight per unit volume of aluminum. This means a lower weight in each part.

Fabrication is Factor—Thus to get the greatest payoff from aluminum, you must also be prepared to take advantage of the most efficient metalworking techniques.

All methods of fabrication should be considered. A decision on the most appropriate method should be based not only on the size and frequency of runs but many other factors.

Some of these are: Part design; performance needs; cost per piece; lead times; types of facilities; investment; marketing and service aspects. Take care that these studies are based on current information; advances have piled up rapidly in recent years.

New Storage System Saves Space

Trucker Totes Bins Through Quick Material Inventory

Close-tolerance stock often provides a storage and handling problem.

Here's a system that offers a number of benefits.

■ For several years, Gageline Steel Corp., Chicago, offered bar stock with an eight microinch finish and with tolerances down to 0.0003 in. It became necessary to devise a handling and storing system that would protect the stock's accuracy.

When the stock comes into the warehouse from the mill it is weighed, inspected for finish, straightness and roundness. It is then put into a specially developed 12-ft long portable bin. The bin holds up to 3000 lb. It's lined with wooden strips to protect the finishes. A fork lift truck, with a reinforced steel tongue, carries the bin to the storage area.

Honeycomb Racks—The bins are placed in a rack which is built in honeycomb fashion. This allows each bin to slide in and out without disturbing other bins.

Gageline uses two racks. Separated by 24 ft, the parallel racks together hold 1000 bins. However, any number of racks can be used depending upon the volume and area of the warehouse.

Finds Size Quickly—The bins are set up for quick access. A main card file is organized, first by grade of metal, and second by size. Every bin is listed according to these two classifications.

To fill an order, the clerk locates the grade of metal and size from the filing system. There, he lists all the bins containing a given size and grade of stock. He tells the trucker only two facts: How much material to remove, and from which bin.

The bins themselves weigh the same. Thus, when filling an order, the warehouse man doesn't loose time figuring bin-weight.

Once he has the order ticket, the trucker pulls out the specific bin with the fork lift and moves the material onto a recording scale. He removes the correct number of pounds from the bin and then returns it to the proper spot in the rack.

One-Man Setup—With this handling system a 1000-lb rush order can be filled in 15 minutes. One man can handle the complete operation if necessary.

Humidity control plays an important part in the system. It prevents condensation and rust. The rack structure keeps bar stock off the floor. Gas-heated air keeps the material at a constant temperature.

The rack's load is distributed evenly on the floor. Due to their structure there is no limit to the height to which they can be erected.

Both physical inventory and visual check of inventory is practical and fast. By using a portable scale a physical inventory of 3,000,000 lb of bar stock can be made in eight hours.

SLIPS INTO PLACE: Each 12-ft long bin holds up to 3000 lb of material. An inventory of 3,000,000 lb of steel bars can be made in eight hours.

QUICK CLEANUP: Metal burrs get a fast brushoff as the silicon-soaked nylon-abrasive turns at 60,000 rpm.

Nylon Pads Deburr Fine Parts

Powder-Packed Fabric Laps Metal With Abrasive Action

Once a part makes its way to the deburring bench, it represents a lot of time and effort. One miscue and all is lost.

Here's a new abrasive material with an eye for close tolerances.

▪ How do you remove machining burr from precision parts, and at the same time hold tolerances to ten millionths of an inch?

Moog Servocontrols, Inc., East Aurora, N. Y., found an answer in disks made of non-woven nylon fabric. The material is impregnated with a very fine silicon carbide abrasive and driven by die grinders at 60,000 rpm.

Hikes Output—Formerly, deburring was done by hand with dental tools. On one job the delivery rate was 10 parts per hour. The nylon abrasive extends the rate to 245. One slip of a dental file could reduce a $350 part to scrap. But the flexible nylon material conforms readily to stepped or tapered holes and threaded areas. Thus, internal diameters are finished smoothly, without disturbing critical dimensions.

The operators are able to develop the desired radii on stepped holes and similar areas with the abrasive fabric. The abrasive material, called "Bear-Tex" by Behr-Manning Co., Troy, N. Y., is supplied in 30-ft rolls, 4-in. wide and about 3/16 in. thick.

Added Punch—Each bench hand die-punches disks or squares to size as he needs them. The pads are slid onto mandrels which in turn fit the chucks of the die grinders.

Because wear slowly reduces the diameter of the nylon disks, they are used in progressively smaller orifices. Deburring is a full-time job. However, a roll lasts each operator a full week.

Disk diameters are chosen to exceed the hole sizes. As the tool enters the hole, the disk takes on a cone shape, giving a lapping action against the metal. Operators are instructed to keep the rotational speeds as high as possible by exerting light pressures. Finished parts are inspected with a magnifying glass and a go-gage.

End Results—The parts being deburred are servocontrol elements. They control the guidance systems of missiles and aircraft. The company has advanced to the manufacture of full actuators and hydraulic-programming controls for machine tools.

Originally most products were aluminum, but higher heat requirements for missile components now call for much stainless steel.

ANOTHER NORTON PRODUCT

The solution that saved millions

Millions of hours and dollars for the metalworking industry.

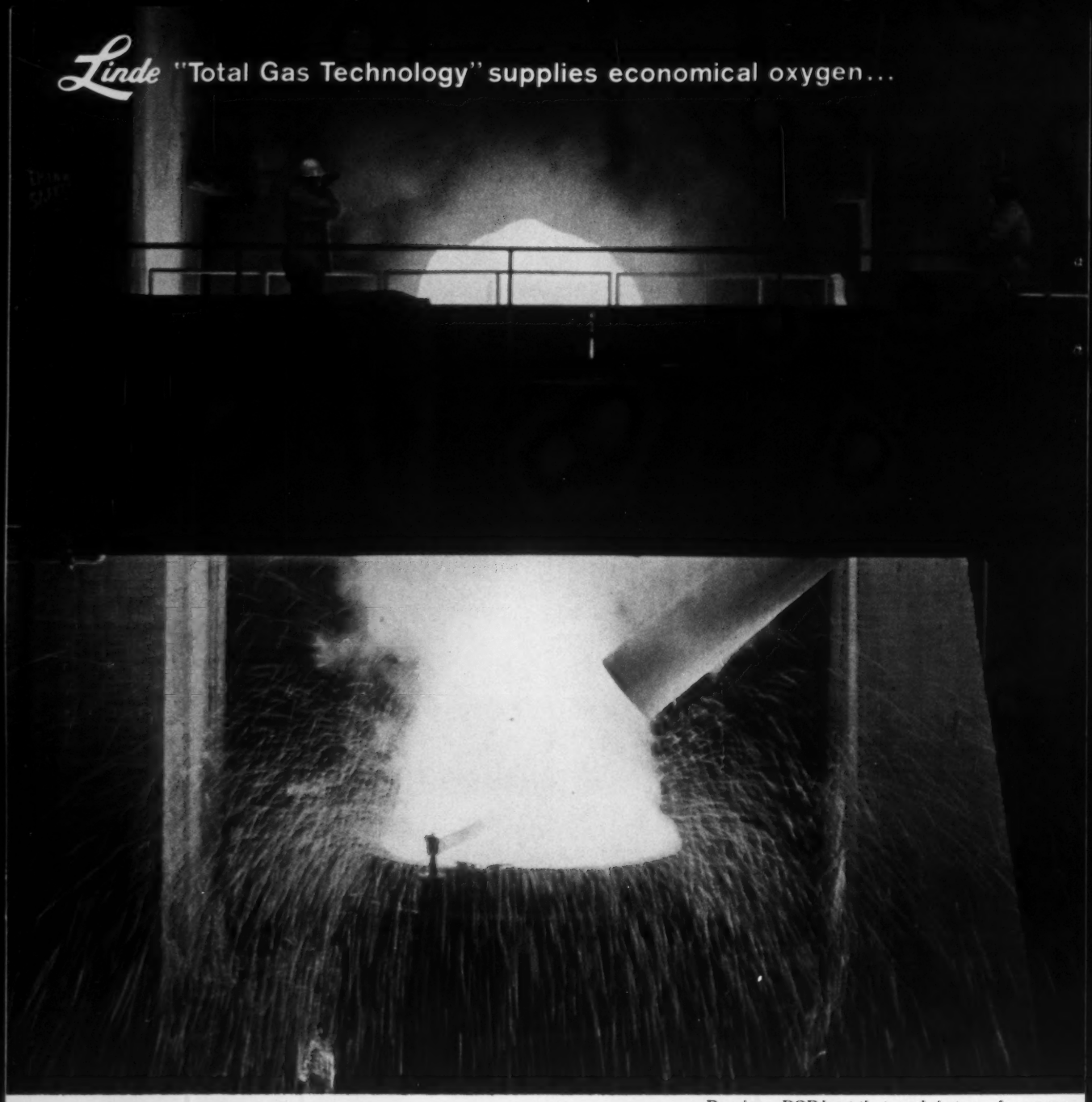
What is it? It's the Behr-Manning resin that makes possible Resinall® coated abrasive belts and discs. They speed up thousands of grinding and polishing operations; produce better results.

Behr-Manning pioneered the art of coated abrasive metalworking; helped develop machines and techniques; and still devotes more men, facilities, and resources to coated abrasive research and development than anyone else in the world . . . and brings you the quality results when and where you need them. BEHR-MANNING CO., Troy, N. Y., a division of Norton Company.

BEHR-MANNING

Abrasive Research

Linde "Total Gas Technology" supplies economical oxygen...



Pouring a BOP heat that used six tons of oxygen.

OXYGEN DOESN'T COST—IT

Every LINDE oxygen customer uses oxygen to save money. In some cases, this is a potential of as much as $4 an ingot ton in the steel-making furnaces alone. ✦ And LINDE's liquid oxygen system can supply supplemental oxygen—for peaks of demand, or full-scale tests—in tonnage quantities. A LINDE-supplied mill doesn't have to wait for a new oxygen plant to start using a new process. ✦ "Total Gas Technology" means more than economical oxygen. New processes, equipment, services are combining to lower production *and* fabricating costs, thus helping to sell steel. *Note two more examples at right.*

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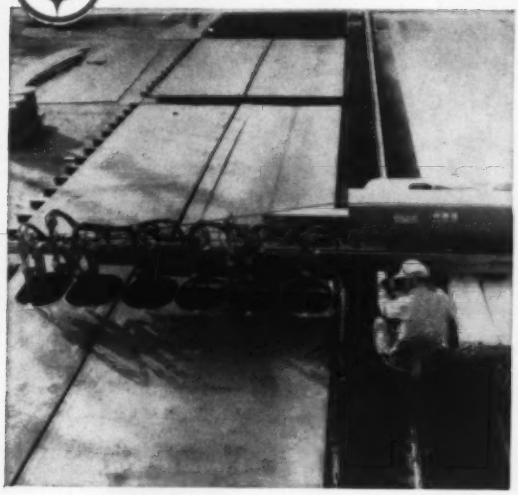
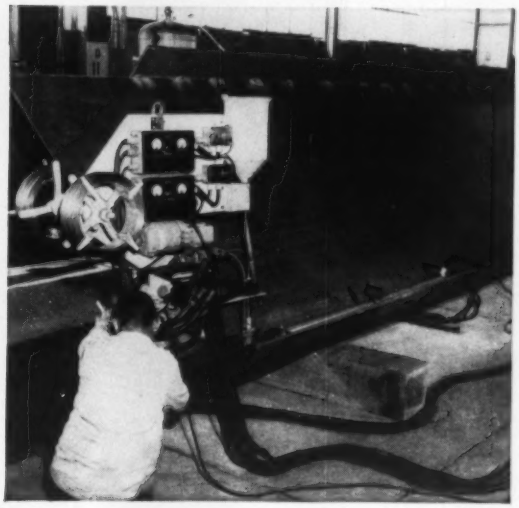
Steel costs lowered by modern technology



New LINDE CM-60 automatic shape-cutting machine. Get top duty cycle and precision cutting of intricate steel parts–directly from line drawings.

Dual electrode UNIONMELT welding speeds attachment of stiffeners in making railroad gondola cars, reducing steel fabricating costs.



PAYS

LINDE COMPANY

UNION CARBIDE

NEW BOOKS

"The Steel Industry 1939-1959," by Duncan Burn is, as its subtitle indicates, "a study in competition and planning" essentially concerned with the steel industry of the United Kingdom. It is a sequel to the author's earlier book, "The Economic History of Steelmaking 1867-1939," but the new book gives more space to developments outside of Great Britain. A substantial part of the text is devoted to a comparison of the organization and development of the steel industry on the Continent, in the U. S. and in the U. K. Mr. Burn writes vigorously from an independent viewpoint, with an exceptional knowledge of the industry and the economic setting. 692 pp. $14.50. Cambridge University Press, 32 East 57th Street, New York 22, N. Y.

"Labor Management Contracts at Work," by Morris Stone, brings together in one compact volume the current thinking of 150 of the country's leading labor arbitrators. Over 15 million workers and their employers in the U. S. are subject to arbitration clauses in their collective bargaining contracts. Since these clauses are invoked thousands of times each year, the awards that result set guide lines for a body of private law for labor and management. Based on the most significant cases and awards of the American Arbitration Assn., this volume illustrates common personnel and industrial-relations problems in ten critical areas. And it shows how arbitrators have resolved them. In the analysis of several hundred cases—all reported within the last two years—the author provides valuable guidance for handling conflicts over layoffs, seniority and ability, call-in pay, holidays, vacations, overtime, discharges, discipline and other issues. For arbitrators, personnel managers, union officials, lawyers and students of labor relations this will be a valuable reference work for the practice of industrial self-government. 303 pp., $5.50. Harper & Brothers, Publishers, New York 16, N. Y.

"Directory of Steel Foundries (1961-1962)" covers the U. S., Canada and Mexico. Published biennially, this 6 x 9 in. volume lists steel foundries, their officers and directors, types of and sizes of castings produced, processes employed and types of melting and heat-treating equipment used. In addition, the "Directory" covers testing facilities, number of employees and monthly capacities. Published in a limited edition, the reference also contains a listing of officers, directors and committees of the Steel Founders' Society plus an index to steel foundries by states. 270 pp, $15.00, Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, Ohio.

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MALLEABLE

For Service Contact...

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Alloy Foundries Division, The Eastern Co., Naugatuck

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Iron Works, Moline
Moline Malleable Iron Co., St. Charles
National Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

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Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division The Eastern Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

NEW PATENTS

Addition Agents

Improvements in, and relating to, chromium-containing addition agents, J. C. Douglas (assigned to Union Carbide Corp., New York, N. Y.), Sept. 6, 1961. Patent covers a method of making a chromium-containing sintered addition agent for use in steel or ferro-alloy melts in an electric furnace. A mixture of chromium ore, iron ore, and carbon is heated in an inert atmosphere to partially reduce the oxides to carbides. British 876,958.

Separates Particles

Apparatus for separating susceptible particles, P. E. Cavanagh and C. W. Hedberg (assigned to Ontario Research Foundation, Toronto, Ont., Canada, and Research-Cottrell, Inc., Bound Brook, N. J.), Sept. 12, 1961. Installation for upgrading magnetite or other low-grade, magnetic iron ores to an iron content of 60 pct or more. Canadian 627,428.

Sinter-Bed Charging

Combination system of mixing materials and deep sinter-bed charging, R. C. McDowell and T. E. Ban (assigned to McDowell Co., Inc., Cleveland, Ohio), Sept. 12, 1961. Patent covers an apparatus for blending and mixing the components of an iron-ore charge to be sintered on a traveling-grate sintering machine. The apparatus also distributes the charge onto pallets to form a deep bed of uniform permeability. Canadian 627,363.

High-Temp Steel

Improvements relating to chromium-nickel-manganese steel, J. D. Murray (assigned to The United Steel Companies Ltd., Sheffield, Yorkshire, England), Aug. 30, 1961. An austenitic steel for use as superheater tubing comprises 14-16 pct Cr, 9-11 pct Ni, 6-6.5 pct Mn, 0.08-0.12 pct C, 0.005-0.007 pct B, 0.4-0.6 pct Si, 0.9-1.1 pct Mo, 0.2-0.6 pct V, 0.8-1.2 pct Cb and/or Ta, and the balance essentially all Fe. British 876,437.

Austenitic Alloy

Improved austenitic alloy, (assigned to Ford Motor Co. Ltd., London, England), Aug. 30, 1961. An inexpensive austenitic alloy having good physical and oxidation-resistant properties consists of 8-10 pct Al, 20-25 pct Mn, 0.75-1.1 pct C, 1-2 pct Si, and the remainder Fe and incidental impurities. British 876,458.

Jet-Age Alloy

Ferrous alloys and articles made therefrom, D. P. Hughes and S. G. Fletcher (assigned to Latrobe Steel Co., Latrobe, Pa.), Sept. 12, 1961. An alloy for making jet-engine and gas-turbine parts comprises about 1.1 pct C, 4 pct V, 0.4 pct Mn, 5.25 pct Cr, 1.1 pct Mo, 1 pct Si, and the remainder Fe and incidental impurities. Canadian 627,285.

Steel Galvanizing

Improvements in or relating to the galvanizing of steel, W. A. Baker (assigned to The British Non-Ferrous Metals Research Association, London, England), Aug. 30, 1961. The resistance of galvanized-steel surfaces to water corrosion is improved by immersing them in a bath of molten zinc-aluminum alloy at a temperature of 410-450°C. British 876,032.

Rotary Kiln

Rotary ore-reducing kiln, M. E. Ronaux, Aug. 30, 1961. Patent covers a design for a rotary kiln for reducing iron ores with high thermal efficiency. The reducing chamber is enclosed in a jacket into which the reducing gas and recycled kiln gas is fed at both ends. The gas is then introduced into the chamber at a midpoint. British 876,211.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

Post-Forming: New Way to Bigger Savings with Malleable Castings

The ductility of Malleable iron castings permits use of high-speed forming techniques to finish Malleable parts at lower cost. Take advantage of the versatility you get only with ferritic and pearlitic Malleable castings. For a fuller understanding of how Malleable can help you, call any producer that displays this symbol —

Free Folder describing these techniques is available for your use. Just ask any member of the Malleable Castings Council for Data Unit No. 116, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

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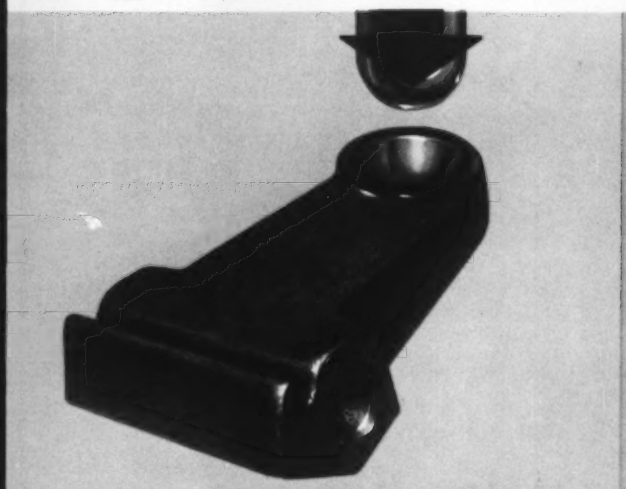
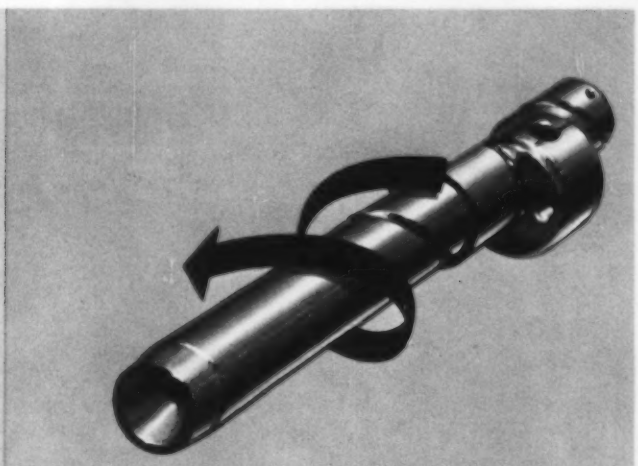
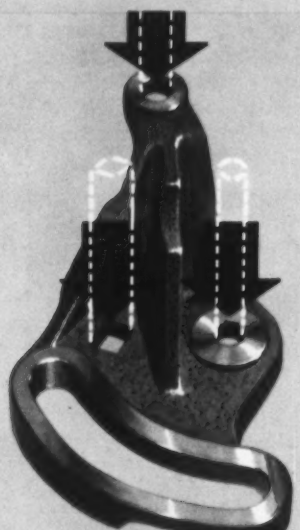


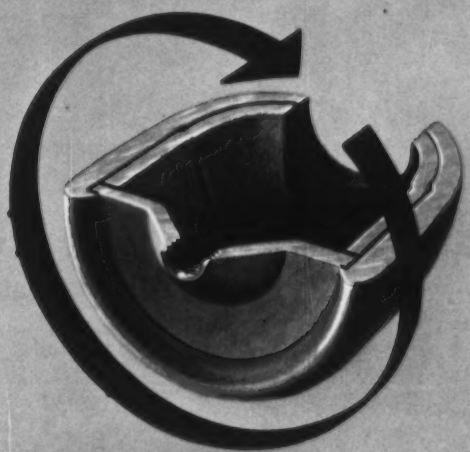
Hot Form It — Hot coining this Malleable transmission part reduces finished cost . . . eliminates three cutting operations required by the previously used steel part.



Roll It — Oil grooves in lawnmower crankshafts and splines in compressor crankshafts are just two of many places where rolling proves more economical than machining.



Punch It — Holes with diameters greater than the thickness of the metal can be punched in Malleable. Two round holes and a square hole are punched simultaneously in this idler arm.



Spin It — Malleable's ductility permits the sleeve and end disc in this ball joint to be held in place by spinning the Malleable housing into a strong, permanent flange.

TOCCO
Induction Heating Anneals Pipe Welds ...In the Welding Line

Page Hersey Tubes Ltd., Toronto, Ontario, is one of several progressive manufacturers using Tocco induction heating to continuously anneal welds in electric seam-welded 4" diameter and larger pipe to improve ductility and toughness.

The Tocco engineered and built post-weld stations are installed in the line following the welding station. Special Tocco developed inductors, powered by two Tocco high frequency generators, heat the weld affected area on pipe up to 8" diameter 3/8" wall to 1700°F at mill speeds. Annealing is accomplished with no extra handling of the pipe and with metallurgical results at the weld area not possible by any other method. The cost is only a fraction of what it would be if the entire pipe were heated in a furnace.

This is typical of the scope and ability of Tocco's engineering staff to solve metal heating problems with induction heating. If your manufacturing operations require heating metal for forging, heat treating, melting, brazing or soldering, it will pay you to check with Tocco for the latest and most effective methods for increasing production and cutting costs.

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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Wire Rope

Registered HI-PLI wire rope slings are illustrated and described in a new four-page, 8½ x 11 in. folder designated as DH-40. Describing the HI-PLI as the wire rope sling that handles like hemp, the folder shows by "demonstration-type" illustrations their extreme flexibility; details user benefits; and includes complete specifications on the 12 sizes available. (American Chain & Cable Co.)

For free copy circle No. 1 on postcard

Which Gear to Use?

A new 36-page catalog includes handbook information to help select right-angle spiral-bevel helical gear speed reducers. Complete specification charts, tables, and dimensional drawings are supplemented by formulas for selecting horizontal- and vertical-type gear speed reducers. A guide to load characteristics on many applications and step-by-step examples of reducer selection are also included. (D. O. James Gear Mfg. Co.)

For free copy circle No. 2 on postcard

Thermocouple Catalog

Here's a new 56-page catalog that covers a comprehensive line of thermocouples for industrial applications. The new catalog not only carries descriptive information on these products, it also includes engineering information concerning thermocouple usage. (Barber-Colman Co.)

For free copy circle No. 3 on postcard

Wheels For Rent

A new brochure details the costs of different lease plans for auto and truck fleets for terms from one to eight years. The brochure, entitled "Profit-Plus," is published by a leading automotive fleet leaser. Costs of different lease plans are cited for fleets from 1-24 units, 25-49 units, and 50 or more units. In Question & Answer form, the brochure explains features of several lease plans, maintenance procedures, insurance costs, and other factors of the cost of lease plans. (Wheels, Inc.)

For free copy circle No. 4 on postcard

Contract Research

An illustrated statement that answers questions that often arise when industrial management considers an "outside" approach to its research needs has just been published. Titled "How Contract Research Serves the Needs and Objectives of Industry," the statement is one of a series on the procedures and characteristics of contract research for industry. (Battelle Memorial Institute.)

For free copy circle No. 5 on postcard

Insulating Foam

Properties, uses, handling and testing of a new Nopcofoam urethane foam for low-temperature insulation applications are described in a new 37-page booklet. The booklet provides graphs, drawings, charts and photographs to describe the new H-602 formulation of Nopcofoam—a rigid pour-in-place foam with such significant features as low K-factor, low cost and exceptional dimensional stability. (Nopco Chemical Co.)

For free copy circle No. 6 on postcard

Three New Steels

A new 12-page booklet on maraging steels gives detailed data on three new steels of unusually high strength characteristics. These three new steels are of a similar composition, but each is designed for special uses such as solid-rocket motor cases, pressure vessels, landing gear components and ship plates. These new steels, which are

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FREE LITERATURE

divided into three groups, A-L 25 Ni, A-L 20 Ni, and A-L 18 NiCoMo. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 7 on postcard

Static Control Systems

A four-page bulletin explains new control technology and industrial control equipment using SCR solid-state semiconductors. Bulletin illustrates and describes physical and operating characteristics of the SCR, shows how it is being used to increase efficiency and reduce size of control systems up to 50 pct in the steel, paper, textile, rubber, and power shovel industries. (General Electric Co.)

For free copy circle No. 8 on postcard

Perforated Metal

Stocked sizes and patterns of perforated metal for ventilation, protection, concealment, construction and ornamental decoration are shown in a new 12-page brochure. The two-color brochure presents the decorative, round and slotted designs in actual size and lists the name for each pattern shown, percentage of open area, gauge dimensions and sheet sizes are shown for each pattern. (Cross Perforated Metals Plant, National-Standard Co.)

For free copy circle No. 9 on postcard

Thermocouple Selector

A new sample board offers quick and easy selection of thermocouples. The "big four" thermocouples shown will satisfy over 90 pct of the standard thermocouple applications, enabling the user to select a thermocouple from stock which is custom pre-engineered to suit many uses. (Smith Thermotronics, Inc.)

For free copy circle No. 10 on postcard

Photodrawings

An up-to-date, 16-page booklet presents a simple method for producing money-saving, high-quality engineering photodrawings for diazo reproduction. Illustrated with an example of a typical assembly drawing, the literature details the five steps from taking the picture, to adding line work, to forming the completed photodrawing. (Log-Etronics, Inc.)

For free copy circle No. 11 on postcard

Fire Brick

A new 16-page brochure outlines the characteristics and properties of insulated fire brick. The brochure describes six types of insulating brick especially designed to cover exposed service temperatures ranging from 1600° to 2900°F. Provided in the brochure is data on the various types of insulated fire brick, heat loss, temperature gradients, and heat storage capacities of these products, as well as shipping weights, special shapes and construction. (Kaiser Aluminum & Chemical Corp.)

For free copy circle No. 12 on postcard

Welding Tips

Offered as a production aid, a chart of "do's and don'ts" deals with precision welding. Printed on heavy card stock for posting at work stations, the two-color chart describes and illustrates 14 major tips for better welding, particularly where precise, highly-reliable welds are required. (Raytheon Co., Commercial Apparatus & Systems Div.)

For free copy circle No. 13 on postcard

Thermocouple Wire

A new catalog on thermocouple and extension wire is designed to provide all the data needed to select the proper wire for a specific use. The book covers thermocouple wire for every measuring and heat-sensing need up to 1800°F. It also discusses a complete range of extension wires to transmit measurements from sensing elements to associated equipment. (Trinity Equipment Corp.)

For free copy circle No. 14 on postcard

Tracer Systems

This new bulletin describes two simplified, electromechanical tracer systems for use with tape, template or dial input. The literature illustrates several interesting applications of single- and two-axis systems to new, specially-designed equipment and to retrofitted machines. (Electronics Div., Seneca Falls Machine Co.)

For free copy circle No. 15 on postcard

Gears Unlimited

A new four-page, four-color brochure describes engineering, testing and production facilities used to develop and produce a complete line of stock gears and speed reducers. Pictured are such gear products as bevel and miter gears, spur gears, helical and worm gears, single- and double-reduction worm gear reducers, and fin and fan-cooled reducers. (Ohio Gear Co.)

For free copy circle No. 16 on postcard

It's more than a matter of taste

Wherever food and metal meet, in a processing plant or kitchen, the metal is usually stainless steel. The flavor *and* purity of food are entrusted to stainless because no other metal matches its resistance to contamination and corrosion. And none—metal or plastic—is so durable, decorative and easy to clean.

Such complete trust in a product comes only from time-tested performance—the reason J&L consistent quality stainless steel is specified by manufacturers of equipment widely used by packers and processors, and by chefs in restaurants, hospitals and hotels. By delivering quality consistently, J&L helps the food industry safeguard its products, all the way from plant to palate.

Get consistent quality stainless steel from your J&L distributor, who is backed by the full facilities of J&L's research laboratories.

Jones & Laughlin Steel Corporation

STAINLESS AND STRIP DIVISION • DETROIT 34

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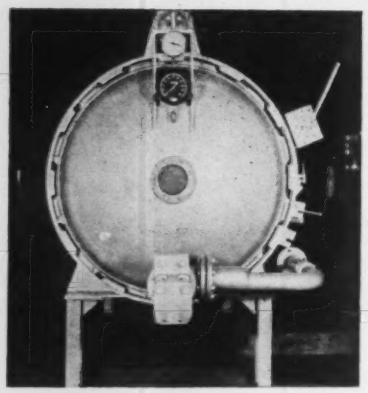
SHEET • STRIP • BAR • WIRE

New Materials and Components



Quick-Opening Safety Door Has Safety Interlock

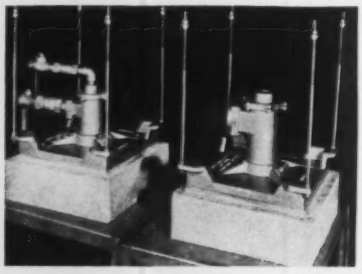
Intermittent wedge-lock design makes opening or closing a new safety-interlock pressure door a matter of seconds. There are no bolts, screws, nuts or handwheels to loosen or tighten. Instead, the only moving part is a rotating band. Thus, the gasket remains fixed in a machined groove and does not move when the door is opened or closed. This method insures longer gasket life. Designed and constructed according to the ASME code with Inspection Agency approval, the closures are available in a choice of manual, pneumatic or hydraulic models. In addition to the safety-position feature inherent in the basic design, there's also a simple, foolproof interlock mechanism. It consists of a mechanical lever and a pressure-actuated pin. (Process Welding & Fabrication, Inc.)

For more data circle No. 17 on postcard, p. 133

Newly-Designed Motors Offer Short Axial Length

Aptly termed "Compact," these streamlined motors boast a much shorter axial length than conventional motors of similar horsepower ratings. As might be expected, they also weigh considerably less. Now in production, the newcomers are available in ratings from 1-7½ hp, and with all speeds including 3600 rpm. The line will soon be expanded to include ratings up through 15 hp. In addition to these integral horsepower ratings, fractional horsepower motors can be ordered in a modified "Compact" design that's shorter than the normal length. All of the motors come in two mounting styles—flange type or NEMA Type C. (Doerr Electric Corp.)

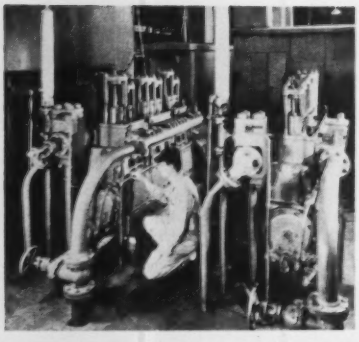
For more data circle No. 18 on postcard, p. 133



Roof-Section Burners Provide Even Heating

Further improvements in a line of roof-section burners include heavy-duty cast cover plates and optional oil atomizers for stand-by service. These burners have a trumpet or bell-shaped flame that rapidly spreads parallel to the adjacent refractory. There's no forward velocity. Flames and hot gases scrub the refractory, heating it by convection. In turn, the refractory radiates heat evenly to the load. This modular 2 x 2-ft refractory tile also cuts the cost of furnace construction. (North American Mfg. Co.)

For more data circle No. 19 on postcard, p. 133



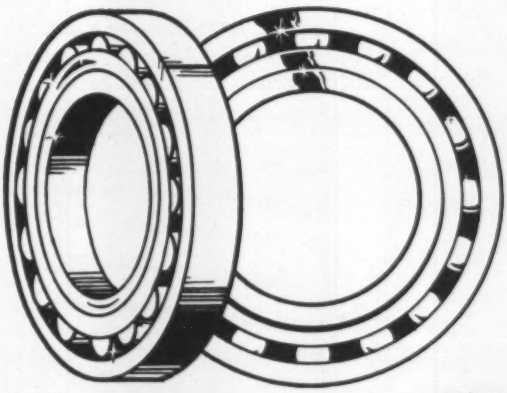
Pumps Stand Up in Demanding Extrusion Operation

Low discharge variation is one reason these direct-flow pumps were picked for a tough extruding application at the H. M. Harper Co. in Morton Grove, Ill. Pump reliability is another big factor. Pressure changes can ruin extrusion tolerances. In this case, two reciprocating units deliver hydraulic fluid to an accumulator for later use in the extrusion press. Pump output is held at 340 gpm under 3600 psi pressure. Concerning pump upkeep, plant engineer, L. Schilling reports that "maintenance manhours are negligible compared with pump operating time. Periodic oil checks and occasional repacking are about all it takes." (Aldrich Pump Co.)

For more data circle No. 20 on postcard, p. 133

NEWS!

KAYDON NOW REDUCES PRICES ANOTHER 25% TO 42% FOR "CP" BALL RADIAL BEARINGS AVAILABLE "OFF-THE-SHELF"



Low prices are also being quoted on many other ball and roller bearings ...both standard (4" bore and larger) and special (2" bore and larger).

You can now save on many of your current and future purchases of these bearings.

Send your inquiry now! Write, wire, or call Kaydon, Muskegon, Michigan. Phone: PLaza 5-3741.

K-619

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All types of ball and roller bearings — 2" inside diameter to 178" outside diameter . . . Taper Roller • Roller Thrust • Roller Radial • Needle Roller • Ball Radial • Ball Thrust • Four-Point Contact Bearings

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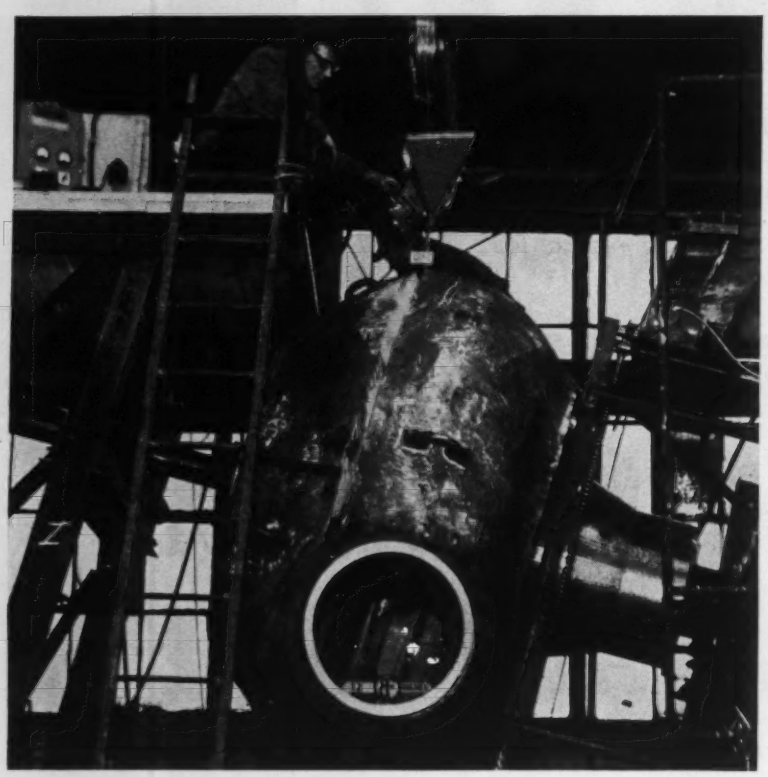


Job Report Courtesy of Bonney Floyd Co., Columbus, Ohio

No cutouts in three 4½ inch thick circular submerged arc welds. Fabrication of these boiling water reactor pump housings called for submerged arc welding of two stainless type 18-8 cast sections. After meeting initial side bend test requirements, the 66 passes in *each* casing—from the manual root pass to the last submerged arc pass—met the standard X-ray test for sound weld metal. This is another demonstration of how Arcos quality filler metal products properly used give dependable results time after time.

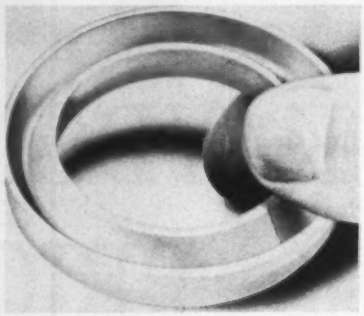
ARCOS

Arcos Corporation · 1500 S. 50th St. · Philadelphia 43, Pa.

DESIGN DIGEST

Hydraulic Cylinders

This new rod seal for machine-tool hydraulic cylinders offers improved resistance to high temperatures and

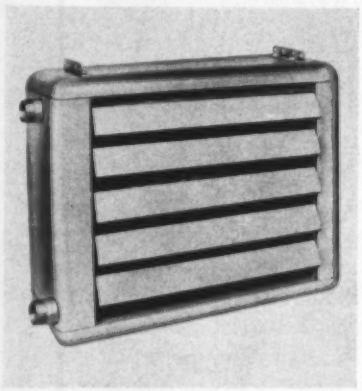


hydraulic fluids. "We recognize that many problems in these cylinders originate when the seals deteriorate and must be replaced," said John H. Harding, vice president of Hydro-Line Mfg. Co., adding, "These new seals should not only prevent leakage, but prolong cylinder life as well." The new rod seals, now standard in Hydro-Line's N2 series and optional in the R2 series cylinders, are made of a highly-fluorinated synthetic rubber that is rated for continuous service at temperatures up to 400° F. It's also inert to most corrosives, including hydraulic fluids.

For more data circle No. 21 on postcard, p. 133

Compact Heater

Designed specifically to meet today's building and heating-system requirements, the height of a new



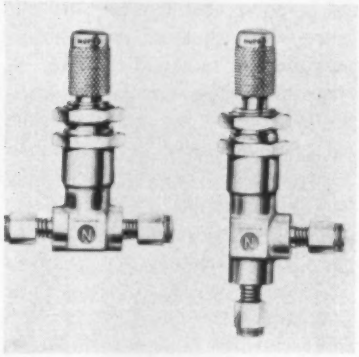
horizontal unit heater has been reduced. Supply and return tappings are located at the side to fit modern

building trends of low ceilings. This arrangement reduces labor costs and makes snug ceiling and wall mountings possible. With its advanced coil, the new heater can be efficiently used with low-pressure, high-pressure, standard hot-water, and high temperature-drop, hot-water systems. In addition, the heater casing is phosphate treated to guard against rust and corrosion and to provide a base for the enamel finish. The rear fan panel is removable—an important advantage that allows complete access to the coil face for easy cleaning. (American Air Filter Co., Inc.)

For more data circle No. 22 on postcard, p. 133

Metering Valves

These new very-fine metering valves are designed to provide ex-



cellent flow control in low-flow ranges with minimum dead space. Small valve capacity provides a choking effect on fluid flow. This eliminates flow surge on initial adjustment. Features include: Flow control in the 0-50 cu cm per minute air-flow range; low dead space of 0.002 cu in.; orifice size of 0.30; O-ring seal to provide sealing below stem threads (this protects threads from possible system contamination); and 56 pitch thread for low-flow adjustments. The units mount on a panel without requiring removal of the handle; while their set-screw locking feature permits locking the adjustment at any desired position. Available in straight or angle pattern styles, the valves come in cadmium-plated brass or 316 stainless steel. They're particularly recommended for gas-chromatography work, laboratory work,

BETTER STAINLESS WELDS WITH ARCOS

Arcos produces a full line of stainless filler metals...coated electrodes, bare electrode wire, consumable inserts, bonded fluxes. This across-the-board selection of filler metals, plus Arcos stainless welding know-how, assures you of the selection of the right filler metal for the most economical arc-welding process—manual, semi-automatic or automatic. Where you use Arcos stainless filler metals you build up the quality of your welds and push down your welding costs.

ARCOS

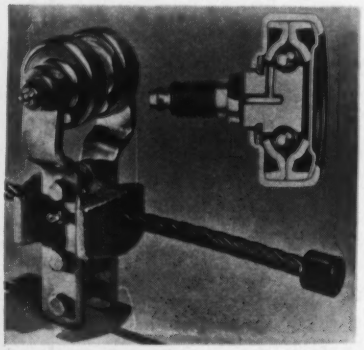
Arcos Corporation • 1500 S. 50th St. • Philadelphia 43, Pa.

or any application requiring minimum dead space and maximum flow control. (Nuclear Products Co.)

For more data circle No. 23 on postcard, p. 133

Conveyor Wheel

Designed for use with the Bush-Lock Overhead Cable Conveyor and other types, a new trolley wheel suits dust, paint, high-temperature, wet or corrosive conditions. Lubricated on the job or at the factory, the wheel is greased for life. It's ideal for use in the finishing of metal or plastic parts and products. These products generally pass through dry-off and bake ovens, as well as spray washers, phosphatizing machines and paint operations. Here, proper lubrication is a must, but the problem is to get just the right amount of grease in the wheels for efficient service. Limited lubrication enables the new wheel to turn more freely than a fully grease-packed bearing. This is a real economy where thou-

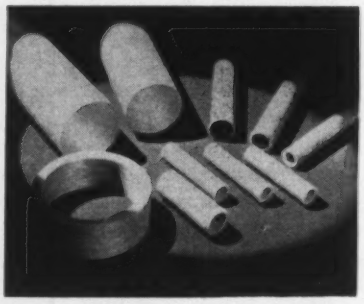


sands of wheels are on a conveyor system. The new trolley wheel has a patented lubricant-sealing feature that lets you use a minimum amount of grease. Nevertheless, there's adequate lubrication for the ball race and a good seal against dirt entrance. Two shots of grease lubricates the ball race and the seal. A cross-drilled hole directs the lubricant equally to the balls and the seal. Conventional pressure-lubricated conveyor wheels have a hole that passes completely through the axle. This requires full packing of the ball race with five or six shots before grease reaches the seal. (The E. W. Buschman Co.)

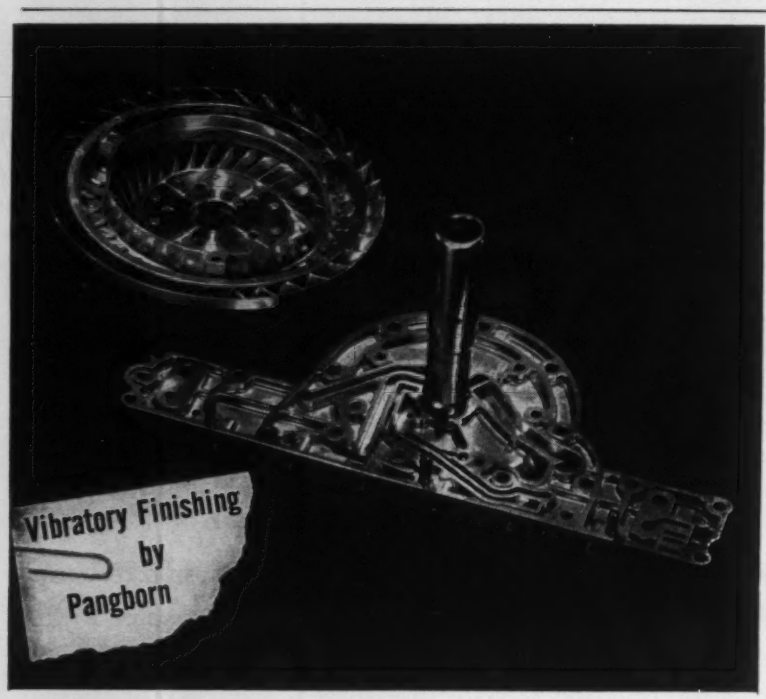
For more data circle No. 24 on postcard, p. 133

Fiberglass Tubing

Here's a spirally-wound fiberglass tube which has nearly 2.5 times the burst strength of G-10 tubing. Des-



ignated Filamite Grade G-12-3730 tubing, this new product is bonded with an epoxy resin. It features extremely low water absorption and low dimensional change under high humidity conditions. The tubing is recommended for applications which require high bursting strength such



Suddenly complex finishing has a simple solution!

The Pangborn Vibratory Finishing Machine has an unusually wide range of application. What would you like to descale, deburr, radius, finish or burnish?

Metal and metal alloy as well as many plastic and ceramic parts may be vibratory finished. This machine processes extremely small and delicate items with the same facility it handles large and heavy objects.

What's more, the Pangborn Vibratory Finishing Machine performs as much as 100 times faster than conventional equipment. Cuts costs? You bet!

All sizes of the machine come equipped with variable speeds and amplitudes plus new improved air-cushioned suspension. Optional air-cushioned floor mounts completely eliminate any transmission of vibration to the floor. Auxiliary equipment and the best in media and compounds are available for your every need. Send parts with exact finish specifications or finished specimen for sample processing in our laboratory to Mr. William E. Brandt at:

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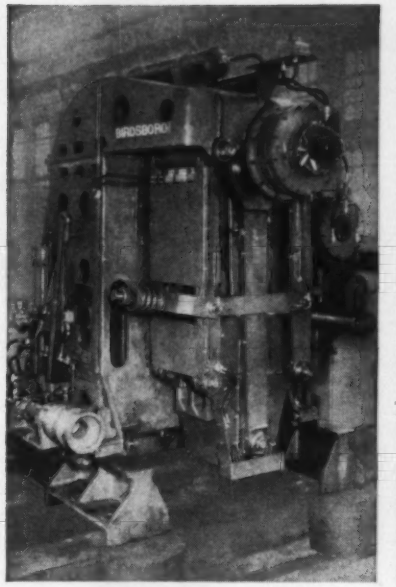
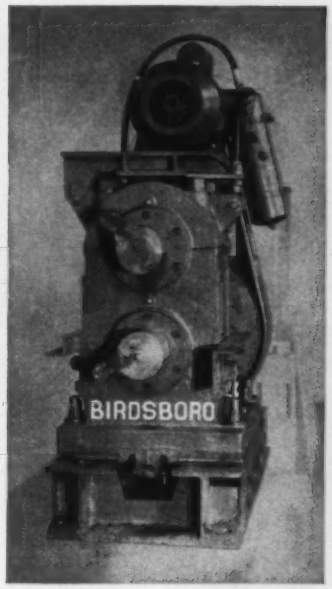
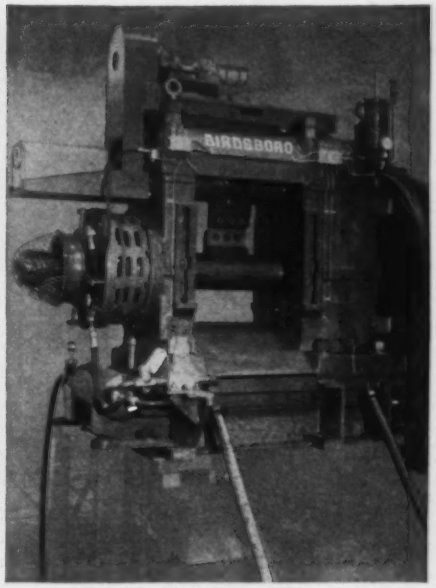
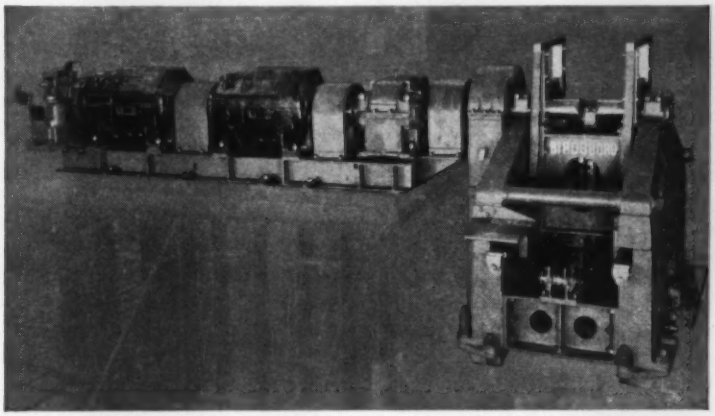


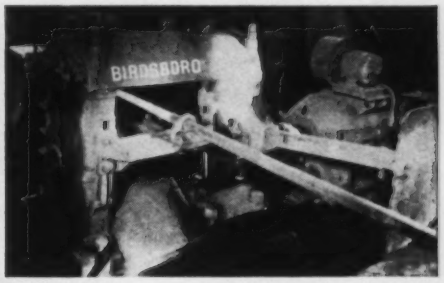




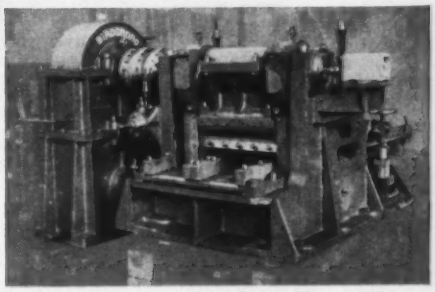
(Left) Pendulum type Flying Shear has an air clutch and brake on both swing and cutting drives, cuts 2¼" square billets at 600 FPM. The Shear is mounted on ways and is aligned with the pass by a motor drive, and clamped in place hydraulically. (Center) Overhung Flying Crop Shear has an air operated clutch and brake type flywheel drive with motor mounted on top of shear, reducing floor space to a minimum. Shear crops front and back end of ovals with areas up to .292 sq. in. at 800 FPM. The Shear is mounted on ways and is aligned with the pass hydraulically. (Right) Enclosed knife, air operated clutch and brake type flywheel drive, Cooling Bed Flying Shear divides 1 3/16" rounds at 2000 FPM at 10 cuts per minute.



Direct drive Flying Shear has a sliding knife frame assembly; cutting action is up and down, with clamping gag, giving square and distortion free cut at speeds of 100/400 FPM; bar is cut into twenty foot lengths.



Enclosed knife, single strand, direct drive, 25 H.P. variable voltage motor operated Flying Crop Shear; crops front and back end of 27/32" square bars at 415 FPM.



Pendulum type, direct drive Swing Shear divides up to 18 sq. in. billets emerging from furnace.

FLYING CROP AND DIVIDING SHEARS

designed and built by

MM 7-61

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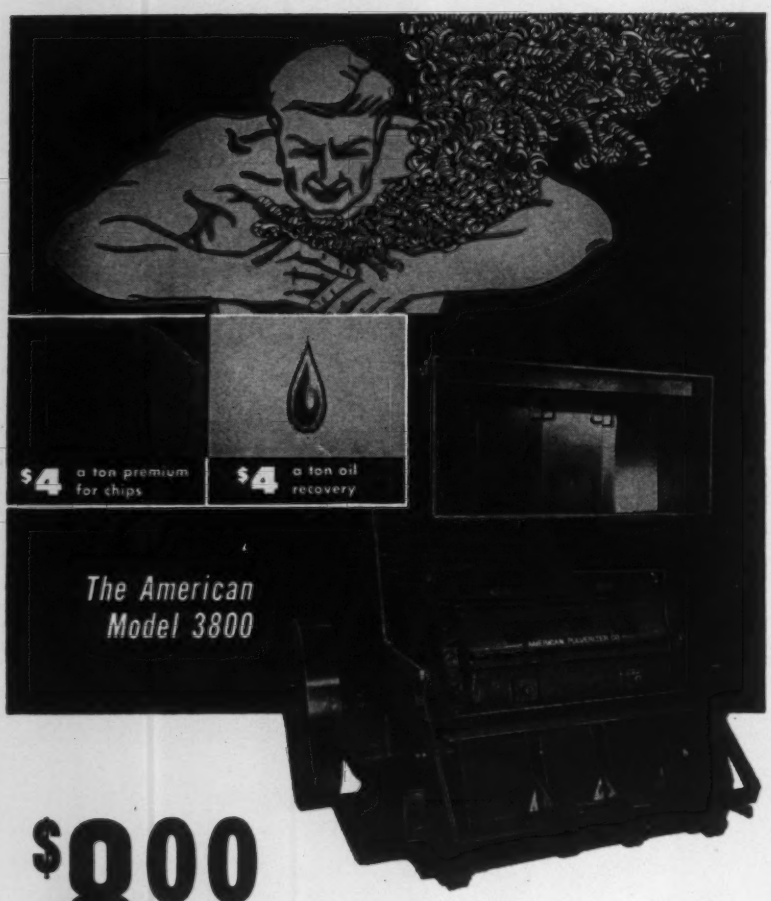

$800 MORE PER TON FROM TURNINGS

American Rolling Ring Metal Turnings Crushers quickly pay for themselves. Savings of approximately $4.00 per ton through extra cutting-oil recovery from crushed turnings often pay for the crusher in a short time. In addition, uniform chips command a higher price (up to $4 more per ton). Add to this the valuable savings in storage space (up to 75% less), the easier handling, the heavier car loadings possible, and you have tremendous profit advantages with the American Crusher working in your plant.

If your turnings amount to 20 tons or more a month, there's an American Crusher designed to pay off big for you.

American has manufactured Turnings Crushers since 1917 and makes a wide range of models with capacities from 1 ton to 50 tph.

Write for Bulletin #159.

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ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
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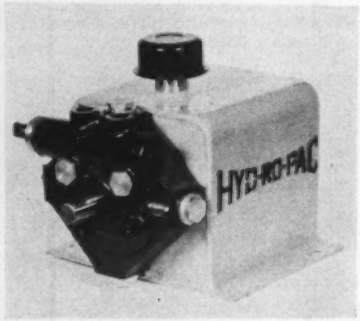
DESIGN DIGEST

as fuse tubes, lightning arrestors and circuit breakers. It comes in a natural color (gray-green) with a smooth ground finish or a clear dipped epoxy finish. Plain tubes are 45-in. long and combination tubes are 36-in. long. The standard size range is ID—½-in. minimum; OD—5-in. maximum; with a 3/64-in. minimum wall thickness. (National Vulcanized Fibre Co.)

For more data circle No. 25 on postcard, p. 133

High-Pressure Pumps

New high-pressure hydraulic pumps feature a built-in relief valve with pressures up to 3500 psi and capacities ranging up to 10 gpm. Their integral control valve makes quick changes from one-way (for



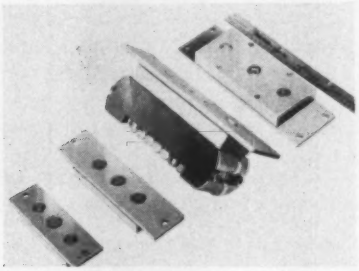
a single-acting cylinder) to two-way (for a double-acting cylinder) operation. All units are cast from high-grade hydraulic cast iron, while pistons, valve spool and shafts are machined from sturdy alloy steel and heat treated for long life. These pumps also feature a positive return of the piston with no connecting rods or springs. Thus the pumps are efficient over a full range of speeds from 1-1800 rpm with positive displacement. Driven by belt, gear, hand crank or power take-off, the pumps can rotate clockwise or counter-clockwise without any changes. (Mechanical Devices Co.)

For more data circle No. 26 on postcard, p. 133

Preloads Way Bearings

These new spring-pads preload recirculating roller way bearings to save time and cost of machine assembly. Parallelism of ways becomes less critical. The spring-pads

eliminate take-up adjustments by compensating automatically for as much as 0.010 in. of thickness vari-

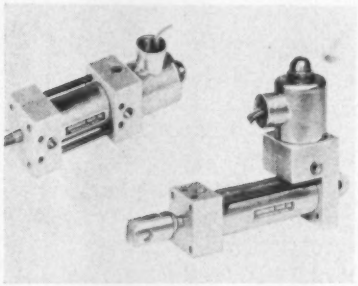


ation in a machine way. A recirculating roller bearing mounted on a springpad performs the dual function of: (1) virtually eliminating friction and its erratic effects of stick-slip; (2) serving as a convenient, low-cost method of accurately guiding heavy machine elements. The pads are available in five standard sizes. (Scully-Jones & Co.)

For more data circle No. 27 on postcard, p. 133

Compact Cylinders

Two new and compact valve-in-head single-acting cylinders have a 1⅛-in. bore. Various types of mountings available. Both models are supplied with strokes from 1-4 in. as standard, and they're available with manual operators. Rear pivot mounting adds considerable flexibility to the uses of the cyl-



inder's valve. Shorter overall length of the unit makes it easy to mount in a confined space. (Automatic Valve Co.)

For more data circle No. 28 on postcard, p. 133

Vinyl Coating Powder

A new low-cost vinyl coating compound is now available in powder form for fluidized-bed applications. Applied by the Whirlclad fluidized-bed coating system with its high-speed production rates, the new

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Roberts now carries special stocks of seamless and drawn-welded tubes—produced to O.D. and I.D. tolerances—suitable for honing, or completely finish-honed!

Yes, now you can select *from stock* the exact tube you need for your cylinder barrels, whether they are designed to above nominal or nominal I.D. dimensions. No more guess work on I.D. cleanup—often a problem with conventional tubes drawn to O.D. and Wall.

And you get these additional advantages with Roberts cylinder stocks:

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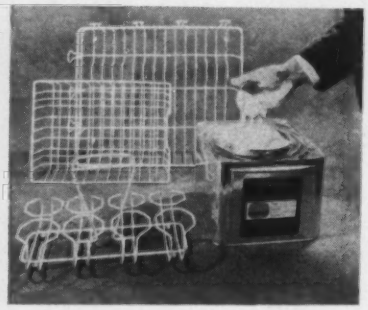
DESIGN DIGEST

vinyl is expected to offer substantial cost savings where uniform coating thicknesses of over 0.008 in. are desired. The compound is classified



as a general-purpose material suitable for a wide variety of commercial applications. But it's not recommended for use where resistance to prolonged weathering is required or where stringent environmental conditions are encountered. (Whirlclad Div., The Polymer Corp.)

For more data circle No. 29 on postcard, p. 133

Rugged Wire Cloth

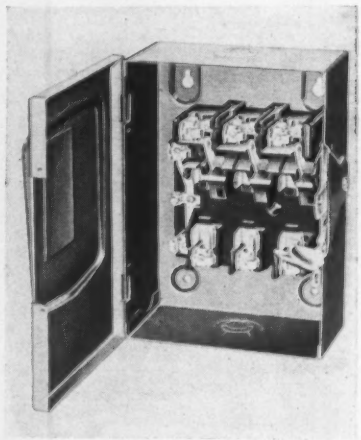
René 41, a nickelbase wire with great strength and oxidation resistance up to 1800° F, is now being woven into wire cloth. Filtering and other applications are expected in spacecraft, missiles, rockets, electronics and nuclear equipment. The vacuum-melted alloy gets its high-temperature strength from a complex nickel-aluminum-titanium al-

loy. It can be age-hardened and heat-treated. It is being woven in a wide range of mesh, wire sizes and types of weave. Normally, the René cloth is woven in widths from 24-48 in. Widths less than 24 in. or greater than 48 in. can be furnished on special order. Price and delivery of René superalloy wire cloth depend on mesh and wire sizes. (Dept. RDT, National - Standard Co.)

For more data circle No. 30 on postcard, p. 133

Safety Switch

A new 60-amp, general-duty safety switch, the forerunner of a complete line of general-duty switches, has recently been introduced. An entirely new design, the switch features a quick-make, quick-break mechanism and a new handle which permits ganging on 9-in. centers.



Available in NEMA Type 1 or raintight construction, the compact new enclosure minimizes mounting space. Yet it provides larger gutters suitable for aluminum wire plus new aluminum lay-in lugs for easy wiring. The quick-make, quick-break switch mechanism has visible blade construction for extra safety. In fact, this new safety switch exceeds NEMA LD Switch standards. (Square D Co.)

For more data circle No. 31 on postcard, p. 133

Fluid Transfer Glands

Fluid-transfer glands, designed to operate at extra-high speeds and pressures, are now available in various mounting styles for all gun-drilling applications. The glands can be used at speeds well in excess of 15,000 rpm and at pressures up to

a thing of the past

Rocker panels have been rusting from the inside out years ahead of other parts of the body. One obvious answer was to form them from corrosion resisting hot dip galvanized. Except that paint peels off galvanized in no time unless it's properly treated. The crying need was for a single phosphating solution to treat steel and hot dip galvanized effectively and at the same time.

Parker's got it!

Bonderite 37, now in use in many automobile body lines and appliance plants, makes paint stick to galvanized like a brother, and creates a corrosion resisting paint bond on steel that matches the high performance of Bonderites that are formulated for steel alone.

If you want to use painted hot dip galvanized for a component that is corrosion-prone, Bonderite 37 is probably your answer, too. Get full information. Write Parker today.

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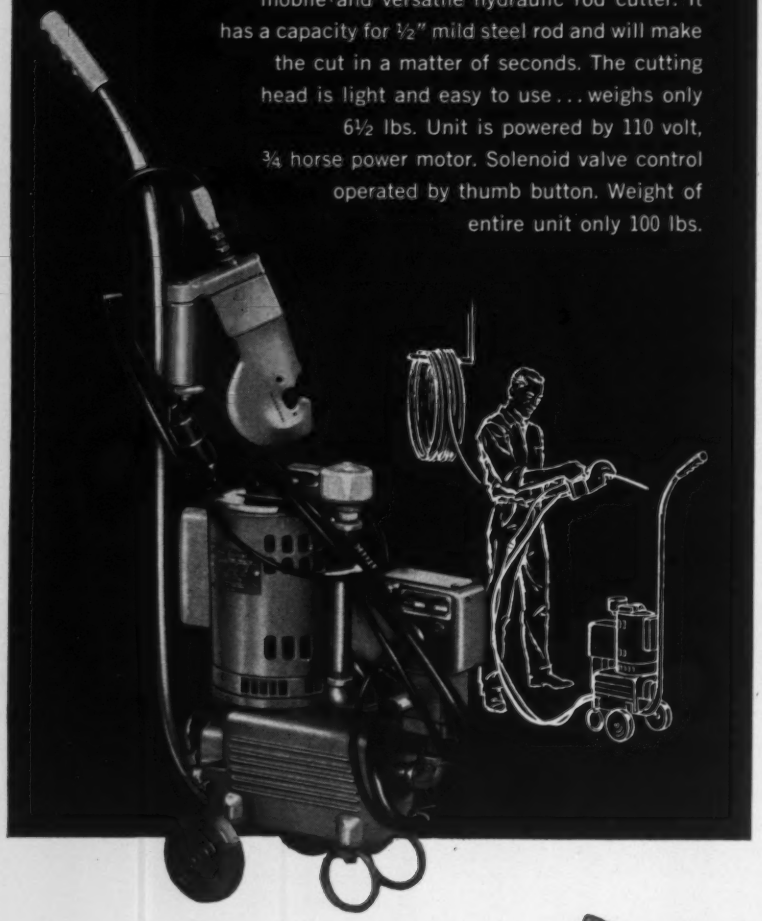
IDEAL FOR TAKING ROD SAMPLES AND OTHER CUTTING JOBS. Here is an exceptionally mobile and versatile hydraulic rod cutter. It has a capacity for ½" mild steel rod and will make the cut in a matter of seconds. The cutting head is light and easy to use . . . weighs only 6½ lbs. Unit is powered by 110 volt, ¾ horse power motor. Solenoid valve control operated by thumb button. Weight of entire unit only 100 lbs.



MANCO offers a complete line of hydraulic cutting tools, punches, rod straighteners. Write for Catalog.

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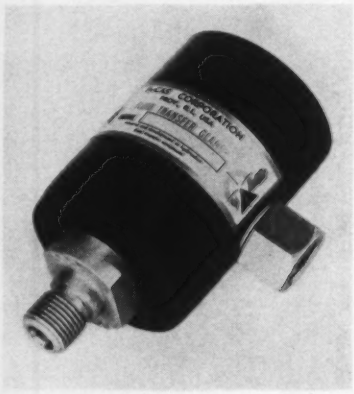
DESIGN DIGEST

1500 psi—and even to 3000 psi, under certain conditions. Outstanding design features, including patented magnetic seals and aircraft-

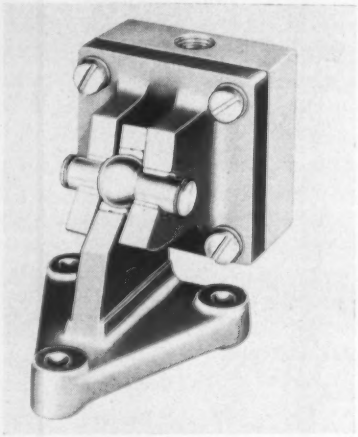


type bearings, combine efficient operation with high speeds and pressures. Results are pulsation-free performance, full accuracy, elimination of maintenance, and lower horsepower input requirements. (Ducas Corp.)

For more data circle No. 32 on postcard, p. 133

Mounts Cylinders

Automatic compensation for cylinder misalignment to ±3½° in any plane is made possible by a new cylinder mount. It not only allevi-



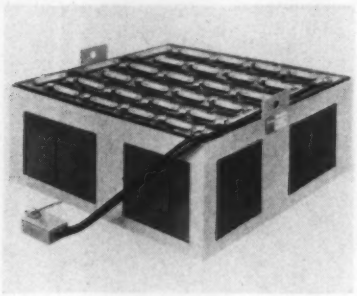
ates excessive upkeep due to inherent and non-correctable misalignment; it also minimizes expensive machining and critical alignment assembly of cylinder and mating part. Simple and economical, the new units consist of a special pivot with

a spherical bearing. This bearing mates with standard swivel and rod clevis mounts. The pivot has a three-pad mounting surface not affected by surface irregularities of the mating part. Thus you can use "as-cast" surfaces. (Alkon Products Corp.)

For more data circle No. 33 on postcard, p. 133

Battery Power Boost

Electrical capacities of nickel-iron alkaline storage batteries have just been boosted up to nearly 77 pct by a significant design improvement. For the first time, designers can use the capacity of these powerful new batteries to power electric industrial trucks in heavy-duty, materials-handling operations. Like their predecessors developed by Edison, the



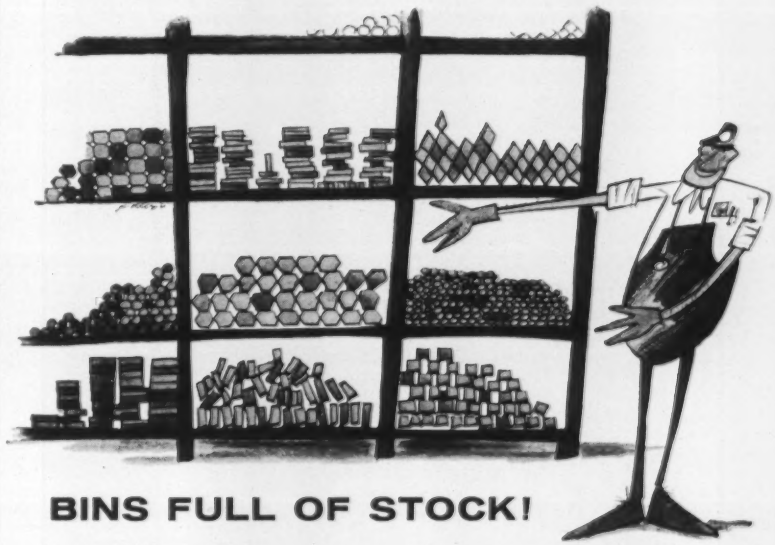
new units produce electric current by the transfer of oxygen from the nickel oxide of the positive plate to the sponge iron of the negative plate. Action takes place in an alkaline electrolyte. But, they have been completely redesigned to make much more efficient use of available space. They are now capable of producing 100 ampere-hours per positive plate. They now produce 1.202 watt-hours per cubic inch, up from 0.68 watt-hours in the former design. (Exide Industrial Marketing Div., The Electric Storage Battery Co.)

For more data circle No. 34 on postcard, p. 133

Turns the Corner

Two new angle drives, a right-angle model and a T type, both use ¼-in. diam shafts out to a 1/16-in. flat. This provides a strong attachment for the coupling ends. Both drives also feature aluminum-alloy housings, steel gears and Oilite bear-

BEANS FULL OF KNOWLEDGE...



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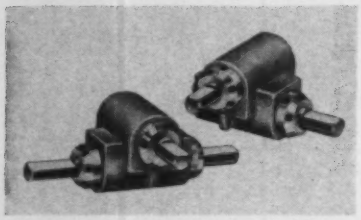
ings. Ultimate static torque capacity is 25 lb-in., with a backlash of

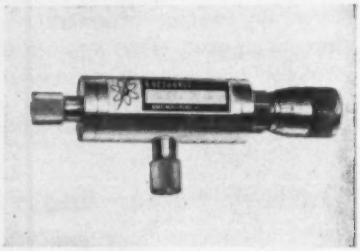


6°. The drives come with gear ratios 1:1, 1:2 and 2:1. Other ratios are available upon special request. (F. W. Stewart Corp.)

For more data circle No. 35 on postcard, p. 133

Precision Valve

Completely redesigned and new in concept, a precision-metering valve adjusts pressures in vacuum vessels from a low of 10^{-7} mm Hg to 1 atm. One exclusive feature is its non-rotating, linear, micro-groove stem, which insures complete control of the leak rate. This stem is housed in a bellows-sealed assembly. Another bonus is fine adjustment. Flow rates can vary from

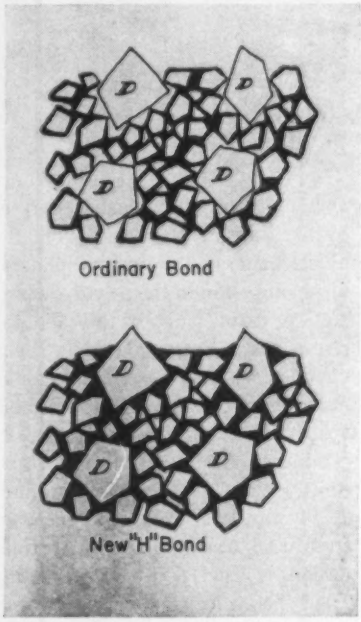


about 0.01-5 cc per second. (Vactronic Laboratory Equipment, Inc.)

For more data circle No. 36 on postcard, p. 133

Boosts Grinding Life

A radical new resinoid-bonding method for diamond wheels is said to give much longer life to a resinoid-bonded wheel. It's especially adaptable for tool and cutter grinding. According to the company, impressive savings have been effected



in grinding and re-grinding tungsten-carbide cutting tools of all kinds. The secret of increased life and cutting action lies in the new resinoid bond which actually enters into a chemical union with the diamond. Up till now, resinoid bonds merely locked the diamond in place and acted as holding socket. (Precision Diamond Tool Co.)

For more data circle No. 37 on postcard, p. 133

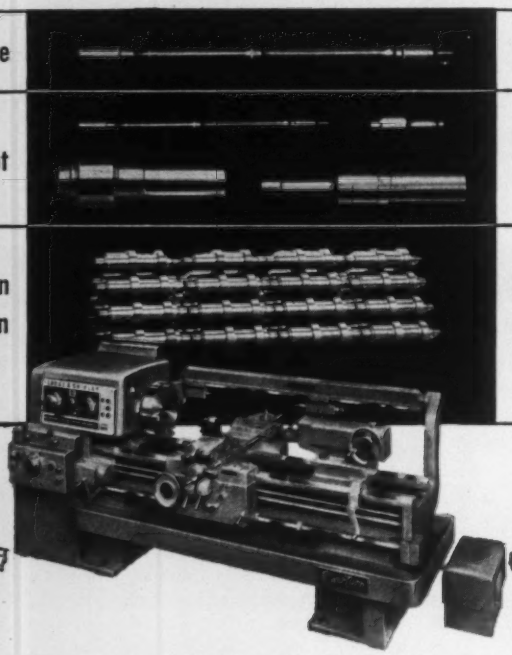
POWERTURN COPYMATIC

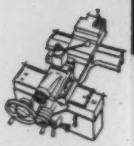
...quick-change artist!

One piece — Precision

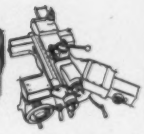
Job lot — Quick Set-up

Production run — Minimum Cost





POWERTURN 90° COPYMATIC CARRIAGE



POWERTURN 45° COPYMATIC CARRIAGE

You've got a good thing going for you when you install a POWERTURN COPYMATIC. Choose engine lathe operation or instantly change over to tracer controlled duplication. Lodge & Shipley offers you a choice of 45° or 90° hydraulic tracing slides. No awkward projections, built for efficiency and operator convenience.

Whatever your choice, Lodge & Shipley has both. Write for literature describing each type of POWERTURN COPYMATIC...fine lathes with records such as: "saving $14,000 per year"..."production increased 300%"..."saves 85% of former time."

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your Lodge-ical choice in lathes...

Lodge & Shipley

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Use it against sparks or light metal splash . . .

AO "Fyre-Free" Clothing Won't Support Combustion

Take any job in the plant with exposure to heavy sparks or light metal splash . . . that's the place for AO "Fyre-Free" protective clothing. Treated with a permanent type of flameproofing, "Fyre-Free" won't smolder — no after-flame or afterglow. It can be washed as many as ten times and still come back for more because the flame-resistant properties stay with it.

This 100% cotton cloth is light in weight . . . with good tensile strength in both warp and fill . . . yet it has the soft feeling of untreated fabric that workers like. "Fyre-Free" clothing is mildew-resistant, does not deteriorate in damp climates or operations.

You can get a full line of "Fyre-Free" coats, pants, coveralls, overalls, sleeves, cape sleeves, aprons and hip leggings. For details and prices, consult your AO Safety Products Representative.

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American Optical COMPANY

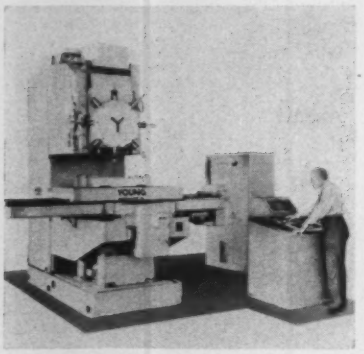
SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS

New Equipment and Machinery

Degreasing System Suits Production Cleaning

Designed for use with Freon-TF for the tough cleaning jobs, or with conventional solvents, a new 500-w ultrasonic degreaser processes up to 1500 lb of steel every hour. The unit has a boiling sump, a heated transducerized tank for ultrasonic cleaning, and a generator to supply the ultrasonic "elbow grease." The package also includes a recirculating pump and filter, a water separator and a spray-rinse unit that's controlled by a solenoid. Heavily-laden parts are first placed in the boiling sump. The ultrasonic tank takes care of any residue left on the part. (Branson Instruments, Inc.)

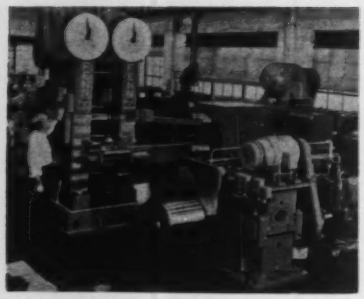
For more data circle No. 70 on postcard, p. 133



New Turret Drill Has Fast Tool-Setting Feature

The advanced design of this new turret drilling machine starts with a basic heavy-duty housing that's large in overall size and exceptionally rigid. In keeping with this beefed-up construction, an oversize motor supplies the drilling power. It's a two-speed, constant-torque type that's connected to a six-speed gear box which drives the spindles through spur gears and timing belts. Another outstanding feature is the instant depth-setting control. Tool cutting depths for each spindle can be set to 0.001 in. in just one minute. The setting operation is performed at a level convenient to the operator. This reduces production leadtime. It also cuts tool-changing downtime to less than two minutes. (McBeth Machinery Co.)

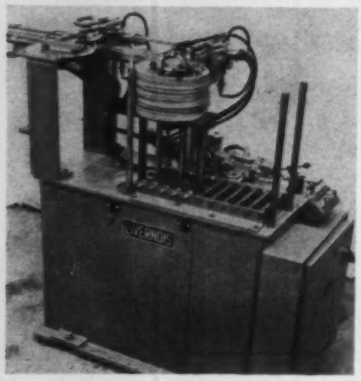
For more data circle No. 71 on postcard, p. 133



Heavy-Duty Mill Rolls Nickel-Chromium Steel

One of the toughest metals, nickel-chromium steel, is flattened into strip in this new rolling mill. To overcome stresses created by the huge separating forces, newly-designed bearings were installed. They're smaller than ordinary roller bearings, but they support greater pressures. In addition, the new mill boasts rigid steel housings that take the increased pressures with minimum deflection. In this four-high installation, special alloy-steel rollers take a maximum separating force of 840,000 lb. Two power screwdowns make the roll adjustments. (Fenn Mfg. Co.)

For more data circle No. 72 on postcard, p. 133



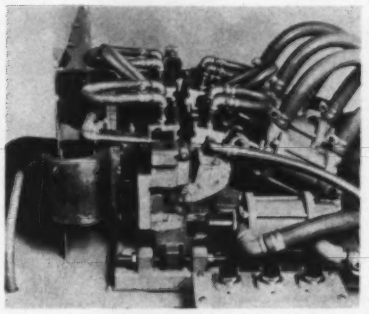
Universal Loader Feeds Thin Precut Press Blanks

On many press jobs, it's cheaper to manufacture stampings from precut blanks, rather than from coil stock. And with a transfer press arrangement, the ideal situation entails introducing the blanks to the dies automatically. Designed for just this job, a new universal loader has been particularly successful in handling thin-gage stock. This thin material is difficult to separate from a stack because of its tendency to "wring together." If the material is non-magnetic, automatic separation is practically impossible by ordinary means. But this machine has a vacuum pickup with an exclusive separating feature. It works equally well on both magnetic and non-magnetic blanks. Just as important, it won't mar even the most highly polished or delicate surface. (Livernois Engineering Co.)

For more data circle No. 73 on postcard, p. 133

Heats and Bends Tube

Rapid heating and close-tolerance bending of ½-in. heavy-wall, forged-steel tubing is performed automatically in a new custom-designed machine. This unit has all the circuitry and controls associated with a resistance welder. It also in-

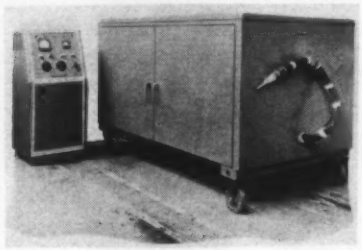


corporates a unique clamping system that rigidly holds the work, and then applies bending force after the lapse of a brief but intense heating period. Work is inserted into machined copper-alloy dies that mount in a horizonal plane on top of the machine. On signal, four air-operated clamps close to exert pressure on the part. A second signal energizes the electrical circuit to apply heat to the work. It also joggles two of the four clamps to form the required curvature. The degree of curvature may be varied through adjustable stops at each end of the die. (Thomson Electric Welder Co.)

For more data circle No. 74 on postcard, p. 133

Electrohydraulic Unit

The first commercial electrohydraulic forming system has recently been announced. This system can



store up to 42,500 joules at 20,000 v. It can be charged to full voltage in about three minutes. Rate of discharge is 33 microseconds per cycle. Electrohydraulic forming is a system for performing, through

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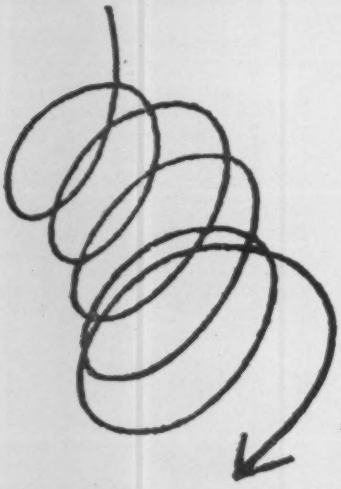

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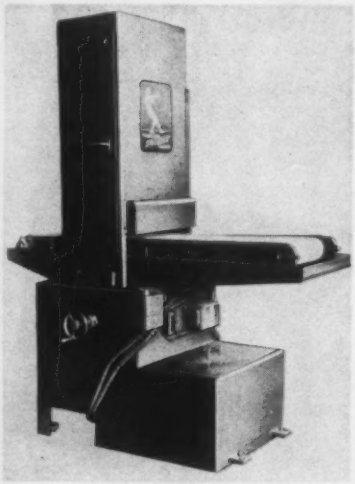
NEW EQUIPMENT

controlled - energy discharge, the same operations now done on heavy press machinery. Some of the advantages are: It can form metals that are difficult to work by conventional means due to work hardening or other undesirable attributes; It can make shapes that are difficult or impossible to achieve by conventional methods. It's low in cost, because plastic or wooden dies can be used; and it permits speedy design changes as "trial-and-error" modifications of dies are easily made. (Westinghouse Electric Corp.)

For more data circle No. 75 on postcard, p. 133

Grinds a High Finish

This new abrasive-belt grinding and finishing machine boasts a built-in coolant tank with a re-circulating

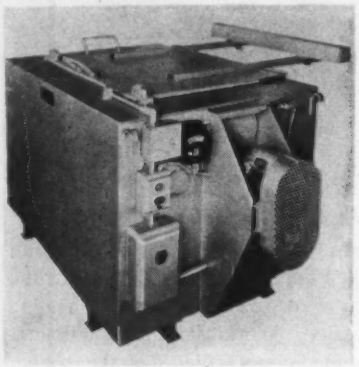


pump. The machine stands out in applications where very fine tolerances are a must. Finishing printed circuit panels in the electronics industry is a good example. It also adapts to flat-surface work with ferrous and non-ferrous metals where wet grinding is essential to a high finish. (Timesavers Sanders, Inc.)

For more data circle No. 76 on postcard, p. 133

Heats Dies to 1100°F

This new top-loading, die-heating oven is designed for heating dies



used in extrusion presses at temperatures up to 1100°F. Close temperature uniformity is maintained by a horizontal air-recirculating fan. Rugged construction permits handling of dies up to 4000 lb. Complete with automatic indicating controls, counter-weighted door, and ribbon-type heating elements, the oven is available in a wide range of sizes. (Trent, Inc.)

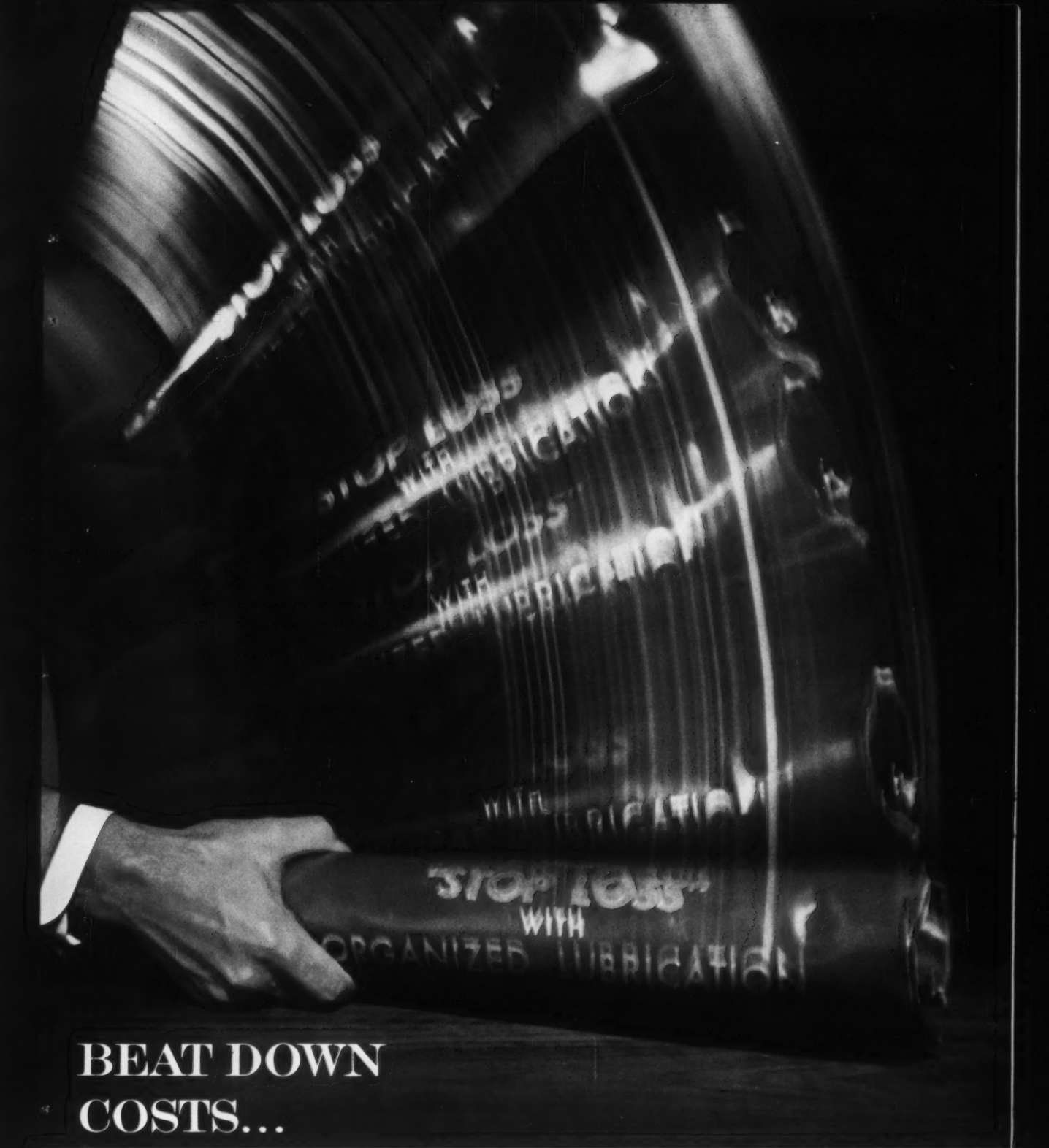
For more data circle No. 77 on postcard, p. 133

Puts Rust to Work

That's the way one company describes its newest protective coating. Applied by brush or spray to any rusted surface, this new formulation

LINDE ELECTRIC WELDING
HELIARC
NOW...GOOD LITTLE TORCHES CAN BEAT GOOD BIG TORCHES

SEE HOW...SEE PAGE 188 OF THIS ISSUE



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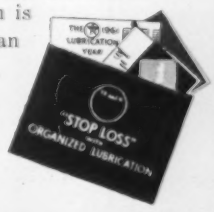
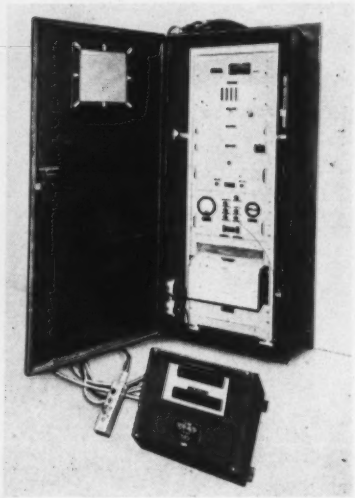


penetrates to the base metal and lays down an iron-phosphate coating. This coating completely severs all contact between rust and metal. The rust is actually converted into iron phosphate. At the same time, the coating acts as a moisture-proof primer that effectively prevents future rusting. In other words, you can check rust without sanding or elaborate surface preparation. (Industrial Metal Protectives, Inc.)

For more data circle No. 78 on postcard, p. 133

Controls Ingot Weight

An electronic, hot-metal-ladle scale controls ingot weight to within ±100 lb for ingots weighing up to 30,000 lb. In one application, the new scale is being incorporated into an ingot pouring system. Capacity of the hot-metal ladle that pours the ingots is 250 tons. According to the manufacturer, the scale controls the weight of each ingot by measuring the loss of weight from the hot-metal teeming ladle. Ingot weights are repeated within ±100 lb per ingot. A printed record on paper tape gives the ingot set-point weight and the



actual weight. The manufacturer also states that the system eliminates errors from human interpolation, smoke, flame, intense heat or volume variation in worn ingot molds. Ingots can be obtained that will give the required number of blooms, billets, or slabs of the desired dimensions or weight. Scrap from over or under weights is kept at a minimum. (Gilmore Industries, Inc.)

For more data circle No. 79 on postcard, p. 133

Furnace Accessory

Here's a new conversion accessory that provides for retort heating in a standard Pereco general-purpose electric furnace. The unit consists of an alloy retort mounted on a movable rack fitted with castors. When the main furnace door is swung open and out of the way, the conversion unit is wheeled into the furnace and locked in place. Then the furnace is ready to perform work in a closely-controlled protective atmosphere. The only limitation on temperature is the capability of the alloy muffle. The silicon-carbide furnace hearth serves as a muffle support structure. However, it may be used as the load support when the furnace is used for more conventional purposes. The muffle, oper-

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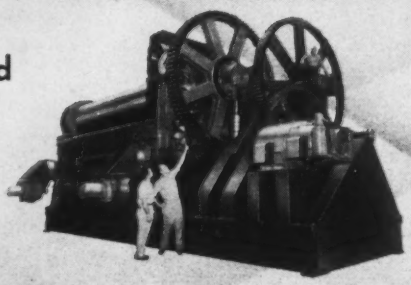
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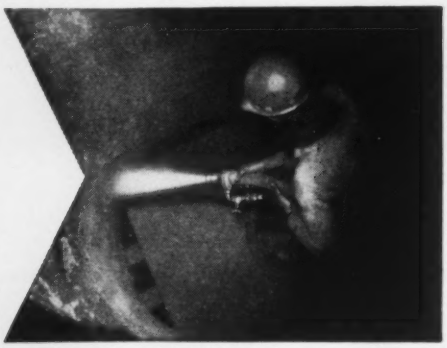

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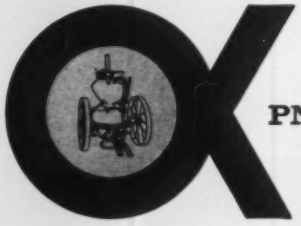

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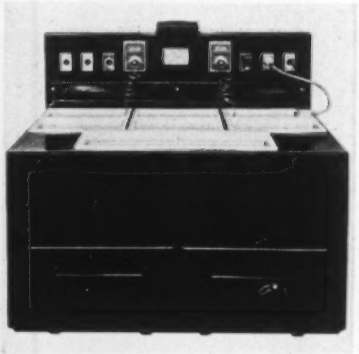
ating on a track, wheels away from the plug-type muffle which fastens to the rack during loading. This feature simplifies loading and eliminates handling of the heavy plug door. For protection of the muffle and the furnace, the plug door is spring loaded to serve as a pressure release in the event of an explosion. (The Pereny Equipment Co., Inc.)

For more data circle No. 80 on postcard, p. 133

Plates Circuitboards

A new self-contained plating console is designed for plating printed circuits, and for small cleaning or pickling operations as well as bright dipping. The console is complete in one unit, and ready for quick instal-



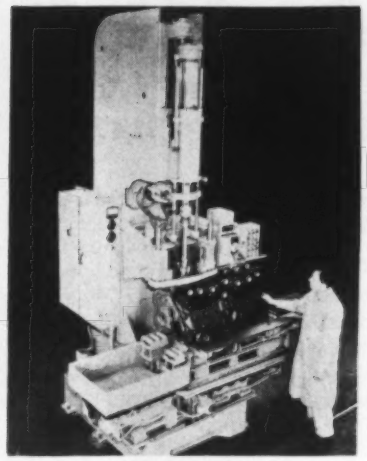
lation. All you have to do is set it in a spot of your choice and make single water, electrical and drain connections. Its prefabricated tanks and floor mountings are heavily coated with Davynol plastisol at the factory. Piping and wiring are also built in. Thus, no additional equipment or installation is necessary. Units are engineered and built to meet the specific requirements of the purchaser. (Davies Supply & Mfg. Co.)

For more data circle No. 81 on postcard, p. 133

Microhoning Unit

Index-table controls are interlocked with the machine controls on a new heavy-duty Microhoning machine. The result: Fully automatic cycling. Abrasive controls include a stonewear indicator and a mechanism that automatically stops the machine when the abrasives are

worn down and need replacing. Part sizing also is automatic. A hydraulically-actuated lowering and raising fixture eases manual loading

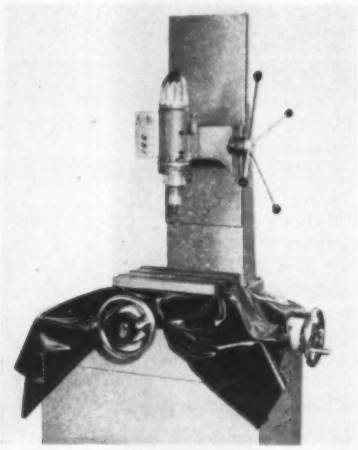


and unloading. The block is moved into position on a set of rollers. These rollers are then lowered to permit positive seating on the work table. (Micromatic Hone Corp.)

For more data circle No. 82 on postcard, p. 133

Low-Cost Grinder

Jig grinding, contour grinding, and internal grinding are easily handled by a new budget-priced machine. According to the manufacturer, it incorporates all the important features of more-expensive machines. For instance, it has a quality main spindle which rides in precision ball-bearings with variable speeds from 50-300 rpm. A fine-feed knob aids hand rotation, and the ON-OFF control is an easy-to-operate pushbutton. The head is graduated into 360° with quick-set



Detail showing tong positioning hot stock between Impacter dies

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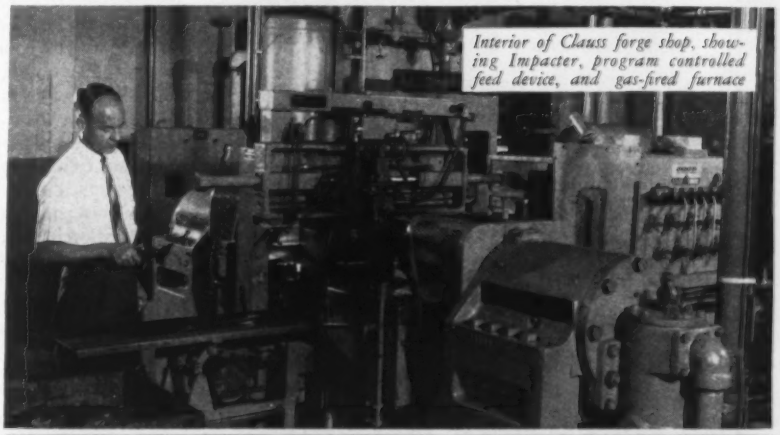

Interior of Clauss forge shop, showing Impacter, program controlled feed device, and gas-fired furnace

CHAMBERSBURG

SHORT ARC

NEW... COMPLETE *SIGMA* SWM-14 OUTFIT AT A LOW PACKAGE PRICE—$1,475

LINDE's all-new SIGMA SWM-14 Short Arc package . . . *all the equipment you need* for welding thin-wall pipe, tubular structural members, all thin-gauge metals—without burnthrough. Short Arc welding uses tiny drops of metal, not a spray. Tolerates 100% gaps. All-position welding with uniform burnoff rate, pinpoint heat control, minimum distortion.

The SWM-14's only "economy" is its price—$1,475. All parts are heavy-duty and readily accessible. *Compare what you get:*

- Compact, detachable wire-feed control unit—with centrifugal governor—swivel-mounted on power supply.
- 200-amp power supply (100% duty cycle) with variable voltage and inductance.
- 14-oz., 200-amp, air-cooled torch for .030-, .035- and .045-in. diameter wires.
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...including powerful Model HP with 2-speed motor for double duty. Easy starting at low speeds prevents blowing of fuses. All models available with attachments for handling many special tasks.

HANDLES 101 CLEANING JOBS
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WORM-DRIVE HOISTS

Adding a hoist or replacing a system? It will pay you to investigate the ElectroLift worm-drive unit first.

Extremely simple to operate, ElectroLift hoists in ¼ to 10-ton capacities feature enclosed worm gearing and motor for clean, quiet operation . . . long, trouble-free operating life, thanks to quality components and materials . . . compactness for operation in close headroom . . . automatic or manual actuation . . . and safe, sure braking action.

For the model, speed and operation best suited to your needs, consult your classified directory for the nearest ElectroLift representative.

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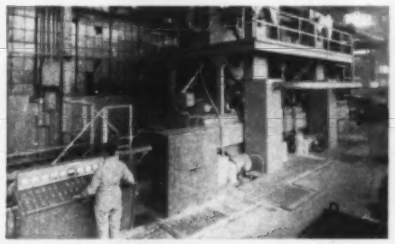
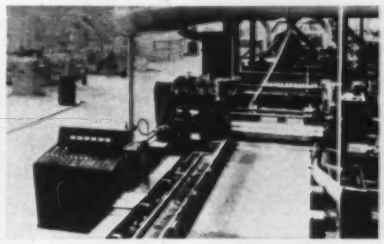
Wheelabrator® cuts descaling and finishing costs 8 ways

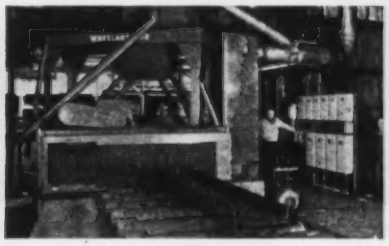
Wheelabrator has built up tremendous technical "know-how" in the descaling of steel since it first pioneered the mechanical descaling process and its associated equipment for the steel industry twenty years ago. This knowledge and experience is reflected in the hundreds of successful cost-cutting applications in eight phases of steel cleaning and finishing. Take advantage of this specialized experience and assistance in developing your modernizing plans. Write today for a copy of Bulletin No. 156-D, "A Pictorial Report on the Modern Concept of Descaling Steel."



Strip and Sheet

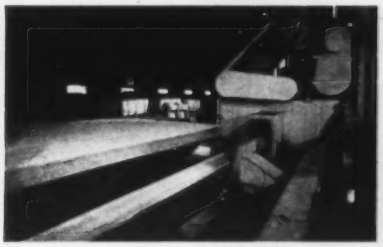


Skelp

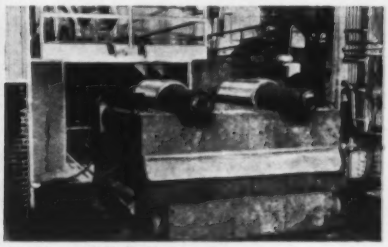


Structural Steel and Plate

Wire Rod and Bar Stock



Inspection of Slabs and Billets



Etching Mill Rolls

A demonstration of WHEELABRATOR'S

VITAL VALUES

VITAL VALUES FOR INDUSTRY

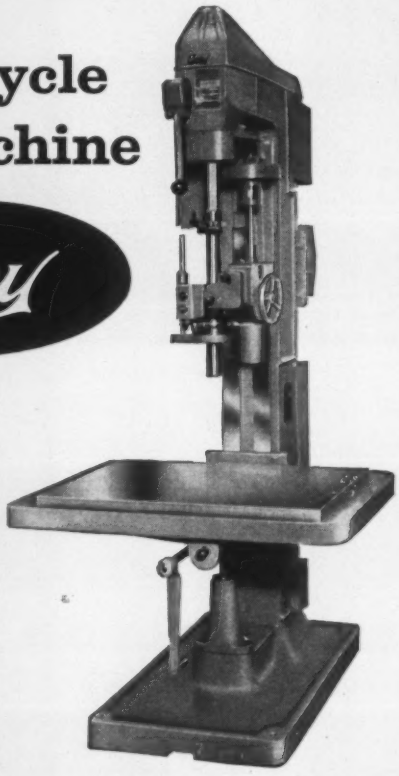
WHEELABRATOR

MECHANICAL DESCALING

WHEELABRATOR CORPORATION, 510 S. Byrkit St., Mishawaka, Indiana. In Canada, WHEELABRATOR CORPORATION OF CANADA, LTD., 1901 Birchmount Rd., P.O. Box 490, Scarborough, Ontario. A subsidiary of Bell Intercontinental Corp.

automatic cycle drilling machine

Avey



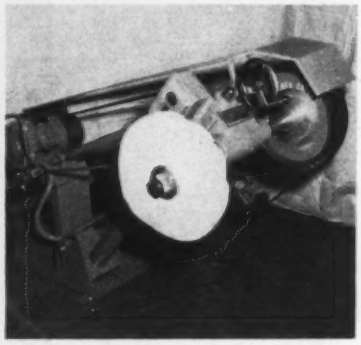
You can chop your time costs with automatic set-ups on this new Avey machine, and still take advantage of the low cost and flexibility of a standard unit. Adjustable rapid power traverse, feed, and rapid return of the spindle permit automatic transfer or rotary index fixturing. You also get adjustable feeds, speeds, table travel, head travel, and Avey's precision spindle. Morse Taper 2, 3, or 4; single or multiple spindles 1 to 5 hp. *Write or phone for data.* Avey, Box 1264, Cincinnati 1, Ohio.

stops for contour grinding. It's also equipped with a disengage knob for indicating. (Speedline Co.)

For more data circle No. 83 on postcard, p. 133

Versatile Grinder

Here's the very latest in a multi-purpose, heavy-duty belt grinder and polishing jack. The machine has a built-in backstand with tracking and tension controls at the operator's fingertips. Abrasive-belt capacity is up to 3-in. wide by 132-in. long. The new grinder's versatility stems from the wide variety of adaptors that may be attached to the free-end power shaft. These include attachments for buffing, wire brushing, tongue and yoke sanding, and disk and internal grinding. The machine also features a removable



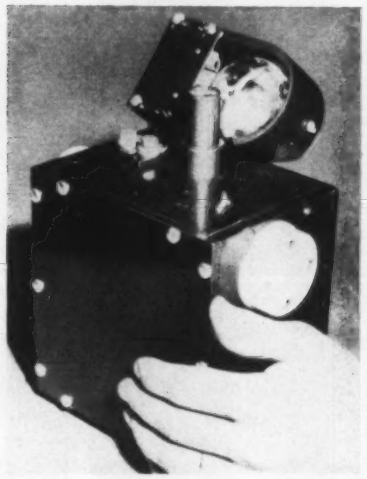
idler that lets the operator perform both straight or contour grinding in just one handling. Ample height adjustment means operator comfort and efficiency since stand-up or sit-down positions are now possible. (Bush Mfg. Co.)

For more data circle No. 84 on postcard, p. 133

Monitors Color

Newly introduced is an accurate color monitor which detects minute variations in color hue and density. It's used for continuous full-range color inspection of a wide variety of products. Designed as a production tool, the newcomer has many uses in papermaking, packaging, printing, plastics extrusion and general manufacturing. In fact, it fills a real need wherever color quality of the finished product is an important consideration. This new moni-

tor is so sensitive it can detect color variations before they can be noticed by the ordinary eye. In addition,

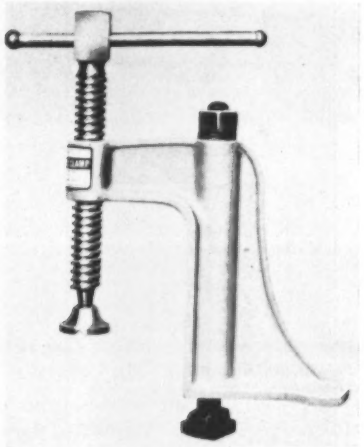


it automatically breaks up the inspected color into segments of the visible spectrum. This permits accurate and independent indications of variations in each. (Hurletron Inc., Electric Eye Equipment Div.)

For more data circle No. 85 on postcard, p. 133

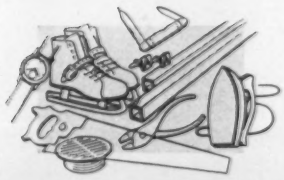
Holds Workpieces

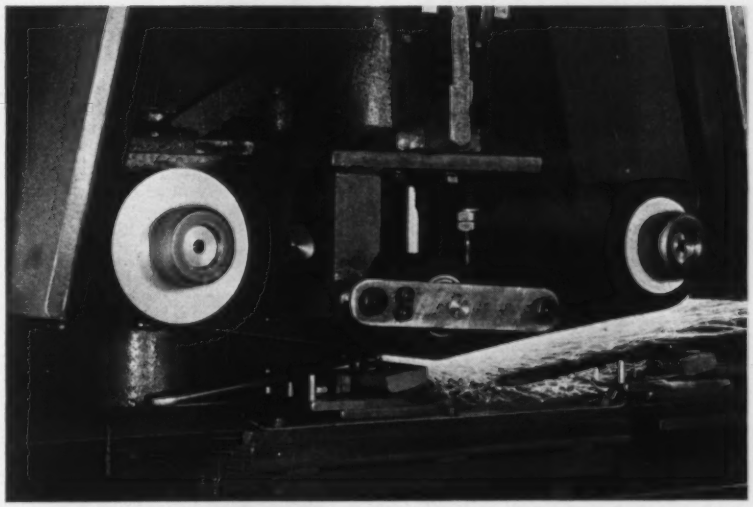
New heavy-duty hold-down clamps install quickly and easily in T-slot machine tables or in wood and metal benches. They're used to hold objects for drilling, milling, welding or other fabricating and assembly operations. Each clamp comes with both a T-slot bolt and a machine bolt for adaption to the desired setup. The holding bolt,



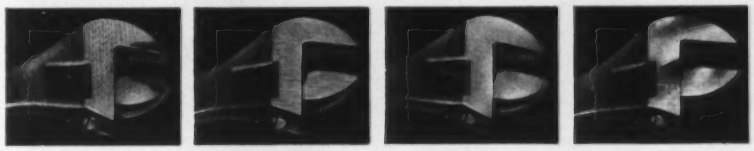
which extends through the clamp frame, is tightened by means of a nut at the top of the clamp. The clamp screw adjusts to the work-

ACME IN ACTION





Progressive Finishing—Flat broached forgings ground, polished and buffed on an Acme Automatic Multiple-Head Machine.



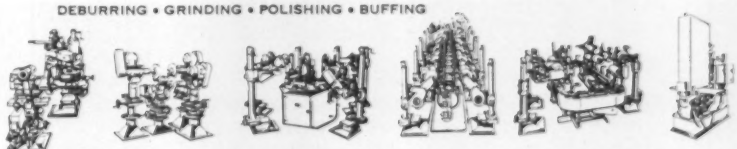
Doing more work with *Movement and Motion*

Designing and building versatile finishing machines that do more work—better, faster, easier, and at lower cost—is a specialty at Acme. Has been, too, for over half a century.

Take the multiple-head flat surface finishing machine shown close-up in action above. It consists of standard Acme components, yet it can be used to perform a number of operations on a wide variety of parts. Deburr, grind, polish—buff or satin finish. All done automatically—in a single pass if desired. What's more, oscillating movement of the conveyor in motion prolongs useful life of abrasive belts and buffing wheels—assures greater uniformity of finish on every piece.

Range of models? Light and heavy duty machines—conveyor belt or pinch roll fed—available in sizes to accommodate your flat parts and products up to 74 inches in width!

DEBURRING • GRINDING • POLISHING • BUFFING



Semi-Automatics Rotary Automatics Straight Line Automatics Flat Surface Polishers

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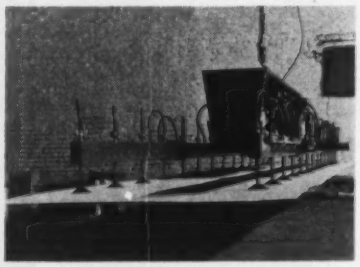
piece and holds it firmly in position. A V-notched swivel holds even round or irregular shapes. (Adjustable Clamp Co.)

For more data circle No. 86 on postcard, p. 133

Gives Saturn a Lift

In making skins for the Saturn missile the problem was to transfer 18-ft long aluminum plate to a mill table for milling, then remove it after slots had been machined part way through the plate. It was necessary to pick up over the milled slots which were 0.080-in. deep and of varying widths. Normally vacuum pads will not seal on such an irregular surface. However, a new vacuum lifting unit solved the problem. It seals across the machined slots and lifts the plate gently without marking or distorting. Here are some of its features. The two pad beams are adjustable to accommodate plates of different widths. Outside vacuum pads are shut off to accommodate a plate of short

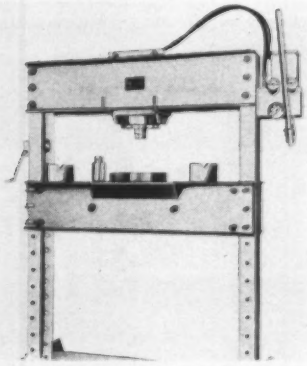


length. Positive release is achieved by blowing air through vacuum pads. Also, the unit was balanced before shipping so that it would hold the plate in a horizontal position. (Airlock Mfg. Co.)

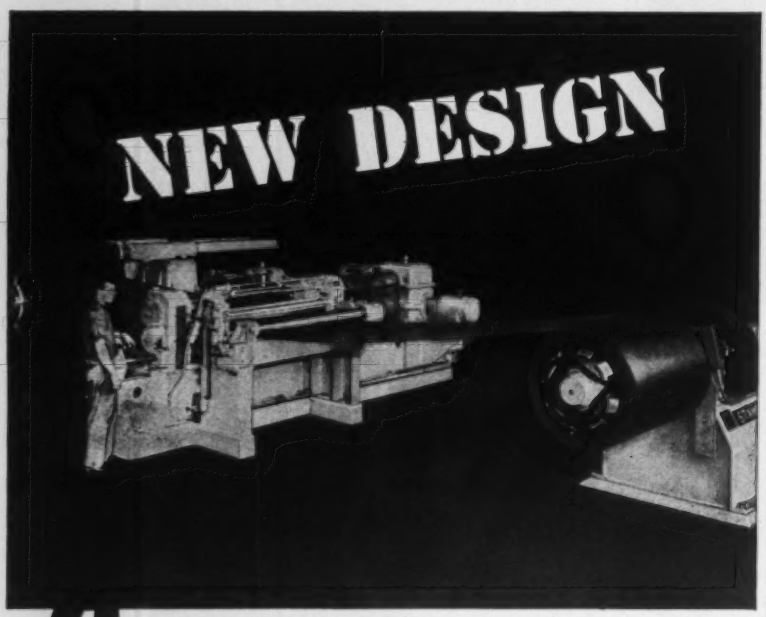
For more data circle No. 87 on postcard, p. 133

Engine-Shop Presses

A new hydraulic press line has been added to an already extensive line of automotive equipment. These "ruggedly-constructed presses" are designed for the varied jobs which arise daily in the automotive machine shop and that of the engine rebuilder. Fixtures are available for removing and installing axle bearings, riveting ring gears, hub and drum riveting and swedging, and universal joint pin removing and installing. The presses are equipped with two speed controls, an adjustable work head, and a positive acting safety valve. The new line consists of 40-, 60-, 80-, 100-, 150-, and 200-ton presses, plus a 12-ton jack press. Individual tank and pump units are provided with two pumps and two control valves that are heat treated for longer life. (Van Norman Machine Co.)



For more data circle No. 88 on postcard, p. 133



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Unit will handle coils of 20 thousand pounds maximum weight with a maximum width of 52 inches. Attractively priced. Contact our specialized sales representatives for complete information.

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New Bremen, Ohio, U.S.A.

Slitting and Cooling Lines • Cut-to-Length Lines • Flying Shear Lines • Power Squaring Shears • Continuous Process Lines • Ferrous & Non-ferrous Mill Equipment

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I. W. Spraitzar, 159 Main Street, Chatham, New Jersey
W. E. Heineman, 122 West Burlington Ave., LaGrange, Illinois
W. H. Millan, 11955 Shaker Boulevard, Cleveland 20, Ohio

10-ton Cranemaster with 2-ton auxiliary at the Allbright-Nell Co., Chicago

WHY IS THIS ONE SO MUCH BETTER FOR YOUR BUSINESS?

Simple Economics. It costs you less to buy . . . to maintain . . . and we guarantee it to work smoother, slicker, more precisely.

The name? **Cranemaster** by Abell-Howe—a years-ahead crane built to help you produce more profits . . . not more headaches.

WHO ELSE for the money has direct drive, die forged, machined alloy steel wheels with tapered tread, precision ball or roller bearings . . . *plus* every other practical feature you want?

Here's how **Thor E. Christensen** of the **Allbright-Nell Co.** feels about their installation.

"We have now had our Abell-Howe 10/2 Ton Crane in service for 6 months, and we would like to say that it is performing to our highest expectations. The 70 F.P.M. 2 Ton hook is a real time saver, and the 15 F.P.M. 10 Ton hook takes care of our heavy lifts with no strain. Even after 6 months we are still surprised at the quietness with which this crane operates. The savings in operating expense as well as initial outlay of the 2 hook trolley versus a single hook high speed 10 Ton crane is appreciable.

"Thanks again for working with us to a most satisfactory installation."

Why waste time? We can prove Cranemaster value in our proposal to you. Send us your requirements when you ask for the new Cranemaster Bulletin offered below.

WRITE TODAY FOR NEW CRANEMASTER BULLETIN

Contains engineering specifications and dimensional data. Clearly illustrates the many worthwhile features of this modern crane.

Need a new modern plant to match your **Cranemaster** crane? Ask for 32 page building brochure.

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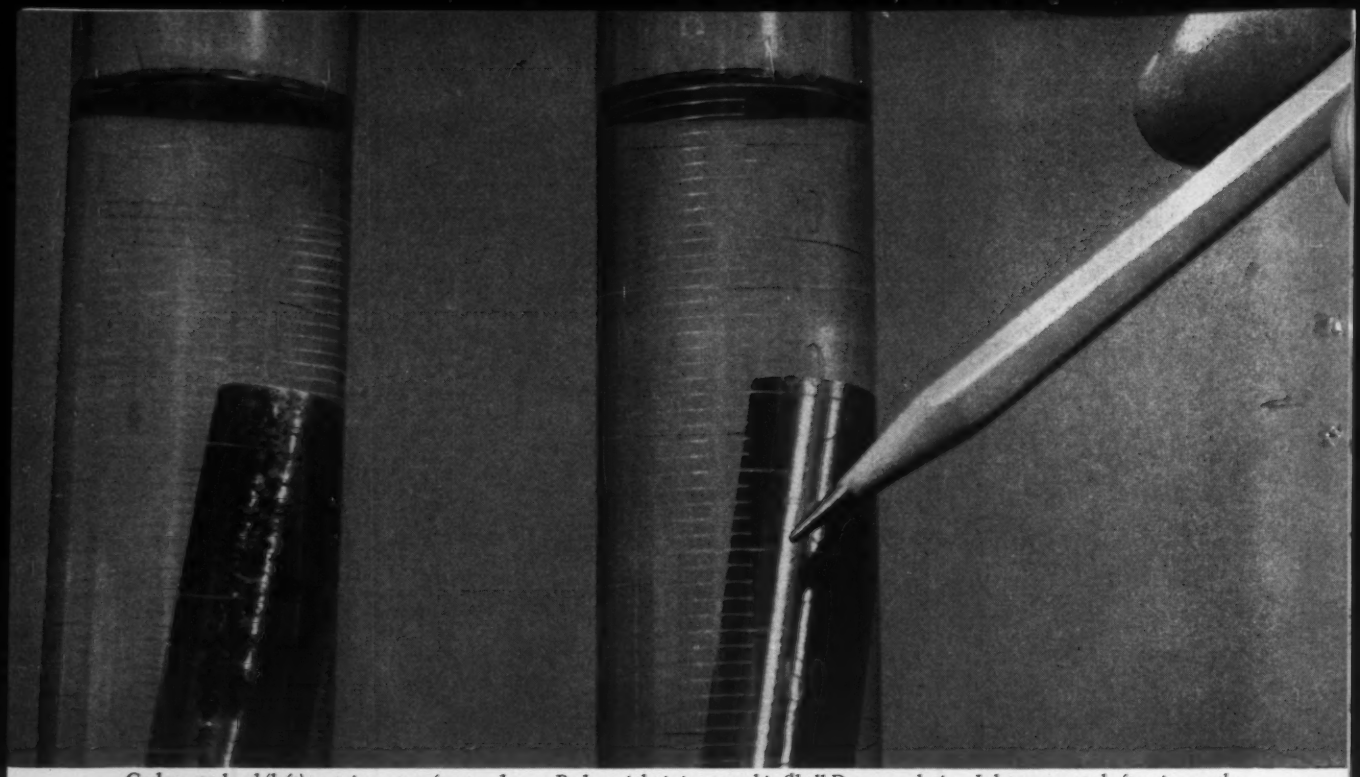

Carbon steel rod (left) rusts in water after two hours. Rod on right is immersed in Shell Dromus solution. It has not rusted after six months.

REPORT:

Shell reports on ten features of Dromus Oils that can help you reduce cutting time and costs

THE Shell family of Dromus® Oils includes both solution-type and emulsifiable cutting fluids.

Each Dromus product has its own area of application—depending on water hardness, metal characteristics and specific job requirements. However, the entire range of Dromus Oils offers these ten benefits:

1. Dromus Oils are concentrates. They are designed to be mixed with the proper quantity of water at point of use for optimum results.

2. Dromus Oil emulsions resist foaming even under most severe conditions.

3. Dromus Oils contain an effective germicide. Result: less danger of rancidity and bacterial growth.

4. Dromus Oils do not separate. Even when mixed into emulsions containing more than 50 parts' water, Dromus Oils maintain their stability.

5. Dromus Oils prolong grinding wheel life. They prevent the wheel from "loading up" with metal from the work.

6. Dromus Oils provide effective corrosion protection for tool and workpiece. (See photograph above)

7. Dromus Oils permit greater dilution than many soluble oils.

8. Dromus Oils wash away metal chips with high efficiency. Chips then settle out of the emulsion.

9. Dromus Oils can be kept in the machine during plant shutdowns.

10. Dromus Oils are made under strict controls. Manufacture of Shell Dromus Oils is scientifically controlled.

There is a Dromus Oil for your cutting, sawing, boring, threading, milling or grinding need. Call your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry.

Automakers Begin Steel Buildup

Increased consumption threatens to deplete already low inventories.

Some users have changed their minds to get on the "order now" bandwagon.

■ The steel market is tightening fast.

The big buildup in advance of the steel labor deadline is coming right on top of a strong pickup in general business.

The immediate result is a sudden improvement in December business. Big steel users, particularly automakers, have advanced January tonnage into December. This is not entirely due to inventory buildup. But a much faster rate of steel consumption in December threatens to deplete already low inventories.

Further, the inventory buildup as a hedge against a possible strike next summer is being advanced by many users. Others, who had indicated reluctance to go in for a possible costly buildup, have changed their minds and are ordering heavily for the early months of 1962.

Reappraise Needs—The general effect of the buildup is that many steel users have had to reappraise their steel needs based on sharply increased consumption coming on top of a need to build stocks.

Generally, the big strength in the market has come from automotive sources. The automakers were the first to indicate plans to build inventories. Now, they are in the midst of the strongest production period since early 1960.

These reports from Detroit sales offices of major mills show the intensity of the order pace: One mill reports its orders in November (for shipment any month) were 50 percent better than any month in some time.

Pace Increases — Another mill booked 20,000 more tons in its Detroit office in November than in the first quarter of 1961. The pace in recent days has intensified. A third Detroit steel sales office has been notified of the obvious, that lead time in orders is going to become more and more important, and to so advise its customers.

Mills officially are blowing hot and cold on delivery promises. Some say they can handle December and January without significant stretchouts. But this approaches the area of wishful thinking.

It now appears that steelmaking will approach 80 percent of capacity before the end of the year. The demands of the auto industry itself can almost assure that rate. They are using up sheet now as fast as they can get it. But other users are sure to come in stronger as demand picks up generally.

Flat-Rolled Tight—In products, most flat-rolled products will be tight. Hot-rolled sheet, cold-rolled sheet, galvanized, long terne, and electrical sheet are virtually on allocation now for the first quarter of 1962. In any case, mills are scrutinizing orders for these products and many will not accept orders that are out of line with past patterns.

With all this activity within the past 10 days, mills expect an even stronger surge of orders after Dec. 15. Then, delivery times are sure to lengthen out and the real strength of the market should become apparent.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	107	105	108	76
Buffalo	102	104	101	59
Pittsburgh	103	103	104	70
Youngstown	94	92	94	62
Cleveland	105	104	120	77
Detroit	155	150	136	92
Chicago	119	113	110	78
Cincinnati	133	139	133	76
St. Louis	135	129	128	86
Southern	103	97	101	81
Western	108	106	116	83
U. S. Index	111.3	109.1	109.7	74.9

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,073	2,032	88,953	93,202
Ingot Index				
(1957-59=100)	111.3	109.1	99.5	104.2
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$34.17	$32.83	$34.50	$28.50
No. 2 bundles	$23.83	$23.17	$24.17	$18.50

Designs Widen Castings Use

Prize-winning steel castings designs reflect teamwork of designers, foundrymen and buyers.

Versatility of castings can lead to cost savings and better products.

■ Foundry PA's and buyers of castings recently had their annual case history review of new and improved products. This happened when the Steel Founders Society of America unveiled winning steel castings designs for 1961. The winning designs are top examples of how product designers, purchasing men, and foundrymen can team up to save money and make a better product.

At LeTourneau-Westinghouse in Peoria, Ill., a differential housing resembling a head for a huge socket wrench was changed from a hogged billet to a cored steel casting for a 20 pct cost saving. Winning designer Fred Szabados and West Michigan Steel Foundry of Muskegon used a 45,000 psi cored rough casting weighing 322 lbs to replace a solid 944 lb billet.

Other Savings — Roughing and hogging time were also cut in half and finish machining reduced about 25 pct. There were also secondary savings in lower inventory, tooling costs and in-plant handling. And the pieces have passed field tests with flying colors.

The foundryman's great design edge, cutting just the right amount of metal where it will do the most good, helped J. I. Case make a more powerful hoe. Chief engineer Elton B. Long and the Superior Steel and Malleable Castings Co. used strain gauges, brittle lacquer, and similar techniques in working out a new "swing tower" for the hoe. This is the pivot point that holds the scoop, arms, power cylinders and other parts and takes extremely high torsional loads.

A GOOD SKATE: A rail car rides on "skates" to prevent fast rolling of car in classification yard. The skate, a prize-winning steel casting, has unique features that prevent derailing at switches, when the car is being 'humped.'

Big Cost Cut — The new Case alloy steel tower was developed to replace a welded design at almost the same price but supporting 35 pct more power. Thus the hoe can dig deeper and faster. The saving was about 5 pct on the remainder of the backhoe, an annual cost reduction of $120,000 for the company.

What must be the world's biggest vacuum cleaner, a Joy Manufacturing Co. unit for cleaning jet runways, was also a big foundry metallurgy hurdle for designer E. D. Lloyd and the cooperating Massilon Steel Casting Co. The vacuum comes from a two-stage impeller driven at 3200 rpm by a 212 hp engine. It must be strong enough to pick up a steel bar 1 in. x 1 in. x 5 in.

Impeller blades were originally of aluminum but designers wanted more strength. Several foundries turned down the job. But Massilon worked out blade castings using SAE 1030 steel with normalizing and tempering to obtain 40,000 psi yield strength and 80,000 psi tensile. About 200 of the cleaners are now in service. They can go 35 mph, and weigh 9 tons.

A Better Skate—A skate that will skate through a frog doesn't sound easy. And it wasn't for S. J. Beck of the Safety Skate Co. of Kansas City, Mo., and Missouri Steel Castings Co.

This kind of skate is one which is placed under a railroad car wheel in a freight classification yard. When a car is being "humped" the wheel rides onto one of these skates similar to a wheel chock, and skids along the track to slow down the car so it won't bang too hard into others. In the old days, brakemen had the dangerous job of riding these cars and applying hand brakes to slow them down.

Put a complete cleaning-phosphating department in your plant at a fraction of the cost and space of standard systems!

AMCHEM **PHOSTEEM***

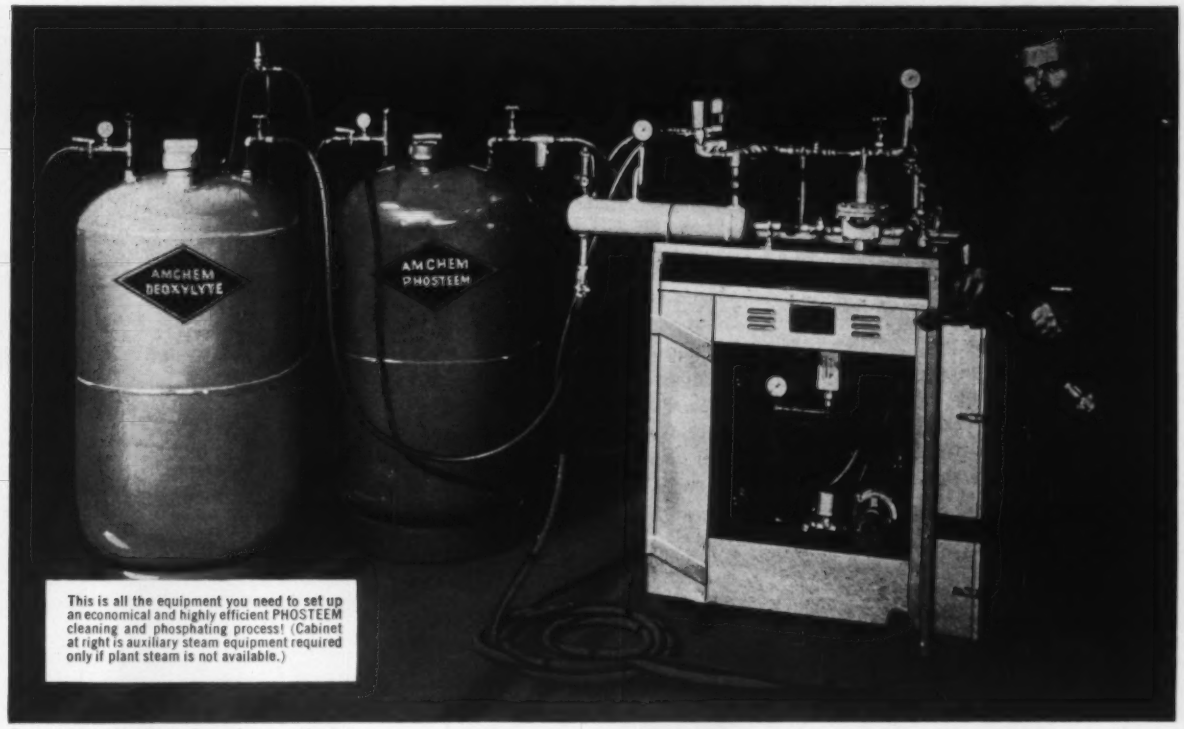

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Photo courtesy of the Electro Steam Generator Co.

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Flat-Rolled Tight From Auto Demands

Many users move January tonnages into December.

Some mills are even refusing orders that are out of line with past patterns.

■ The first effects of the rapidly-rising steel buying fever are being felt.

As expected, most of the inventory buildup has started with the auto producers and is threatening to fan out from Detroit. Demand for flat-rolled products has tightened the most.

December now looks much stronger than at any time during recent months. Some users are moving January tonnage into December and are also increasing their January and December orders.

Scrutinize Orders—The inventory buildup is cutting heavily into mills' supplies of hot-rolled, cold-rolled, galvanized, long terne and electrical sheet. The mills are beginning to look more closely at orders for these products. Some mills are refusing orders that are completely out of line with past patterns.

Just how quickly others will follow the automotive industry's buying lead remains to be seen. There's evidence that steel warehouses already are stepping up their orders. Some mills believe that scare-buying is almost at hand. Others fell the true impact won't be felt until after December 15th.

Meanwhile, more pressure is being thrown on the cold-rolled mills due to a sudden pickup in the demand for tinplate.

Sheet and Strip—Auto producers are out in front of the buying group. Inventory building at warehouse levels has yet to show big gains. But service centers now appear to be revising their inventory plans upward.

In **Pittsburgh,** one sheet mill's backlog has risen 25 pct in the last 30 days. Another mill looks for a 10 pct gain in December and a 15 pct jump in January. It isn't accepting orders out of line with past patterns. Another mill says it isn't close to allocations. But it has asked its big customers how much tonnage they want blocked off.

A **Detroit** mill expects to stretch out booking of flat-rolled products in the near future, but not so much on other products. Another mill there has received many requests to move tonnage from January into December. The mill apparently is suggesting that payment of a 4 pct tax may be cheaper than buying conversion or premium steel next year.

In **Chicago,** steel warehouses continue to show mild gains. But they may pick up considerably now that automakers are crowding for early delivery and apparently are using up sheet almost as fast as it is delivered. Galvanized and terne plate already are about cleaned out for January.

Bar — One **Pittsburgh** producer predicts shipments of this product will rise 10 to 15 pct in December. So far, about 90 pct of the improvement comes directly or indirectly from the automotive industry.

In the **Midwest,** mills are on 20 turns and bar has become a grade to be watched. Farm and earthmoving equipment are coming in strong behind auto demand. Mills say they don't want to extend bar cycles beyond 45 days. However, some mills already are at that figure and are still building backlog. This indicates that cycles could go to 60 days in early January. This would be equivalent to a two-week extension of delivery times.

Plates and Shapes — In **Pittsburgh,** a few customers are talking about first half commitments but the big surge isn't expected before February or March. In the **Midwest,** structural remains relatively slow with little inventory building. For all practical purposes, plate—at least wide plate—is an allotment item.

Tinplate — After lying virtually dormant for weeks, tinplate is starting to pick up in the **Midwest.** This is putting more pressure on the cold mills. In **Pittsburgh,** December orders for tinplate are called surprisingly strong by one mill.

Pipe and Tubing—Tubular products are still quiet. Oil producers are talking about building stocks of oil country seamless but there is no real change for any product. Inventory orders from oil producers are not expected until the end of December or early January by one mill. Standard pipe stock-building orders are not expected until the second quarter.

Wire Products—In the **Midwest,** wire products are reported gaining in the manufacturing grades, but so far the situation has not caused concern.

There are no changes reported in the market elsewhere.

PURCHASING AGENT'S CHECKLIST

Trade assn. executives feel upswing into 1962 has now started. P. 90
Hot-strip mill computer steps up quality, curbs waste, and upgrade operating practices. P. 113
Machine tool order rate is high despite Oct. drop. P. 103

COMPARISON OF PRICES

(Effective December 1, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Dec. 4 1961	Nov. 27 1961	Nov. 6 1961	Dec. 6 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	49.50	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.49¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Dec. 4 1961	Nov. 27 1961	Nov. 6 1961	Dec. 6 1960
Pig Iron: (per gross ton				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.11
Foundry, South Cin't.	71.92	71.92	71.92	71.92
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd. Philadelphia	70.11	70.11	70.11	69.61
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. Cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig Iron	$66.44	$66.44	$66.44	$66.32
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50	$33.50	$33.50	$26.50
No. 1 steel, Phila. area	33.50	33.50	33.50*	33.50
No. 1 steel, Chicago	33.50	31.50	31.50	25.50
No. 1 bundles, Detroit	30.50	29.50	29.50	21.50
Low phos., Youngstown	37.50	36.50	37.50	28.50
No. 1 mach'y cast., Pittsburgh	44.50	44.50	45.50	44.50*
No. 1 mach'y cast., Phila.	47.50	47.50	47.50*	47.50
No. 1 mach'y cast., Chicago	45.50	44.50	44.50	41.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$34.17	$32.83	$32.83*	$28.50
No. 2 bundles	23.83	23.17	23.18*	18.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper electrolytic, Conn.	$31.00	$31.00	$31.00	$30.00
Copper Lake, Conn.	31.00	31.00	31.00	30.00
Tin, Straits, N. Y.	122.125†	122.375	123.50	102.50
Zinc, East St. Louis	12.00	11.50	11.50	13.00
Lead, St. Louis	10.05	9.80	11.00	11.80
Aluminum, ingot	24.00	24.00	24.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

Prices At a Glance 165
Comparison of Prices 169
Bars 178
Billets, Blooms and Slabs 176
*Boiler Tubes
*Clad Steel
Coke 181
*Electrical Sheets
*Electrodes
*Electroplating Supplies
Fasteners 180
Ferroalloys 182
Iron Ore 180
Merchant Wire Products 180
*Metal Powders
Nonferrous
Mill Products 175
Primary Prices 169, 174, 175
Remelted Metals 175
Scrap 175
Piling 176
Pig Iron 180
Pipe and Tubing 181
Plates 178
*Rails
*Refractories
Service Center Prices 179
Shapes 176
Sheets 177
*Spring Steel
Stainless 180
Steel Scrap 172
Strip 176
Structurals 176
Tinplate 177
Tool Steel 180
*Track Supplies
Water Pipe Index 181
Wire 178
Wire Rod 177

*Appears in the Nov. 30-Dec. 14 issues.

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Market Firms Up In Many Areas

New firmness has entered the market this week, ending declines across the nation.

Pittsburgh, Cleveland and Detroit have joined Chicago as firmer markets. Prices climbed in all four centers.

■ Definite signs of firmness have entered the scrap market this week. It's the first general improvement in two months.

Pittsburgh, Cleveland, and Detroit joined in new price increases. Factory bundles surged ahead in Chicago, for the second straight week.

There is a conviction now that bottom has been reached. Dealers look for increased orders as steelmaking operations pick up. And export orders for January are expected in the next few weeks.

Some areas report stable prices. But there is activity and interest stirring across the nation after weeks of declines and softness.

Scrap export will be the big question in many areas next year. Japenese export demand is expected to be 20 pct less than 1961. Currency problems of the Japanese and unloading difficulties in Japan home ports are prime factors in the slump.

The Iron Age composite price for No. 1 heavy melting advanced to $34.17 this week, from $32.83. No. 2 bundles composite price also rose, to $23.83, from $23.17. The increases were on the basis of price rises in Pittsburgh and Chicago.

Pittsburgh—Prices of the best scrap grades moved up this week, on the basis of sales in industrial and dealer markets. On a local list, No. 1 factory bundles were sold for about $1.50 over last month's average. This was followed by a purchase of No. 1 heavy melting at $36 to the dealer by a mill on the fringe of the district. Last month's price at this mill was $34. Gains for these and other prime grades stirred hopes for a stronger January market and left brokers reluctant to make commitments at present prices. However, the only local buyer of No. 2 bundles was holding to a price range near $25. There has been no change in the prices quoted dealers for turnings.

Chicago—This market began an upsurge as factory bundle prices advanced sharply at midweek. By the end of the week, other grades were moving up quickly. Some prices appeared to have already bypassed the bundles gain. Mill buying is still restricted. But sales at the new levels are reported. Several mills have indicated little interest in new purchases, but this has not affected market enthusiasm.

Philadelphia—Bottom seems to have been reached and weakness is definitely leaving this market. All grades are moving at the new prices and dealers are becoming more optimistic. Mills are still buying selectively. Dealers see signs of an upturn on the horizon.

Cleveland—Prices are up $1.50 on top grades here, on the basis of a strong showing by automotive lists. They will go partly to a local mill for $37, and partly out of the district. Range was over $2.50 with the last list bringing a top of over $36 on track. Local foundry bought 2-ft cut structural at $2 higher, or $35.50, plus a $2.50 springboard. Market has turned bullish with dealers very reluctant to sell.

Cincinnati—Market is up $1 on prime grades with local mill orders up. Major area list went for $34.50 on track and will probably go upriver. No. 1 dealer bundles were incorrectly quoted in Nov. 23 and Nov. 30 issues; they should have been $32.50 to 33.50.

New York—The market remains slow, with prices of most grades unchanged. Domestic demand is poor and export is moving at a reduced rate. As expected, cast grades moved $1 lower last week. Stainless grades are also weaker, with some price changes downward. In the Nov. 30 issue, 430 prepared solids should have read $60.00 to 65.00.

Detroit—A large purchase of industrial scrap bolstered prices in this area and sent some items up $1 to $1.50 over last month's level. Action at the dealer level is less strong. December tonnage will be heavy due to firmer automaking schedules.

St. Louis — There's talk here about bullish feelings but little action. Mill inventories are good and dealers are not anxious to sell.

Birmingham — Scrap movement here is slow and is expected to stay that way for at least 30 days.

Buffalo — The market here is quiet as prices have bottomed out at current levels. However, outlook for early next year is bright.

Boston — Market here is also quiet this week. Prices are still low because of a lack of business.

Houston—Prices are unchanged but they may fall unless some activity bolsters the market. Export is slow. Cast market is nil.

West Coast—The market is depressed all along the coast. Most top grades dropped $3 per ton. Prices continue weak at the lower levels. Export has dried up.

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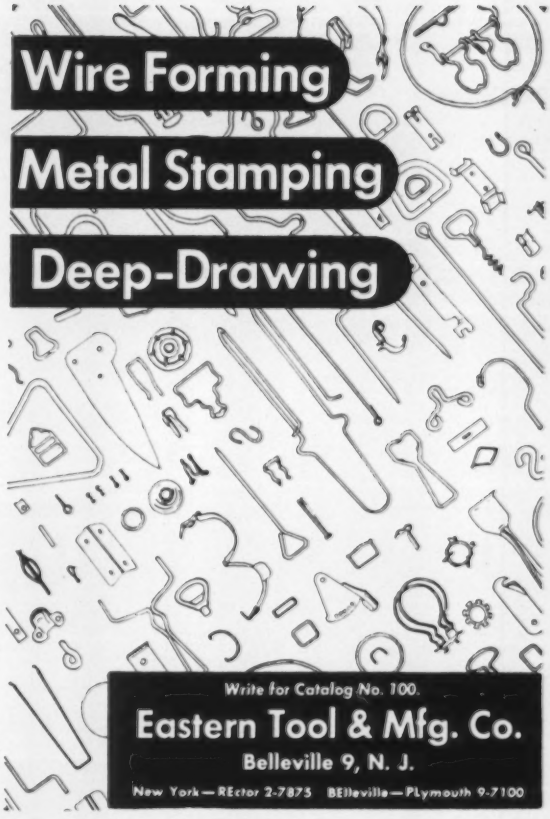

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SCRAP PRICES *(Effective December 4, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy melting	28.00 to 29.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	42.00 to 43.00
Heavy turnings	29.00 to 30.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	49.00 to 50.00
RR specialties	44.00 to 45.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	30.00 to 31.00
Stainless	
18-8 bundles and solids	180.00 to 185.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	80.00 to 85.00
410 turnings	50.00 to 55.00

Chicago

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	44.00 to 45.00
Low phos. punch'gs plate, ½ in. and heavier	44.00 to 45.00
Low phos. 2 ft and under	41.00 to 42.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	57.00 to 58.00
Rails 2 ft and under	49.00 to 50.00
Angles and splice bars	42.00 to 43.00
RR steel car axles	55.00 to 56.00
RR couplers and knuckles	42.00 to 43.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	39.00 to 40.00
Cast iron wheels	33.00 to 34.00
Malleable	44.00 to 45.00
Stove plate	33.00 to 34.00
Steel car wheels	40.00 to 41.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	90.00 to 95.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	10.00 to 11.00
Mixed bor. short turn.	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Shoveling turnings	18.00 to 19.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	26.00 to 27.00
RR specialties	40.00 to 41.00
Rails, 18 in. and under	48.00 to 49.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	38.00 to 39.00
Cast iron car wheels	40.00 to 41.00
Malleable	47.00 to 48.00
No. 1 machinery cast.	47.00 to 48.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	33.50 to 34.50
No. 2 bundles	18.00 to 19.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	39.00 to 40.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	29.00 to 30.00
Drop broken cast.	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	33.00 to 34.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	39.00 to 40.00
Low phos. punch'gs plate	34.00 to 35.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft & under	34.50 to 35.50
No. 1 RR hvy. melting	37.00 to 38.00
Rails 2 ft and under	47.00 to 48.00
Rails 18 in. and under	48.00 to 49.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	44.00 to 45.00
No. 1 machinery cast.	45.00 to 46.00
Stove plate	37.00 to 38.00
Malleable	48.00 to 49.00
Stainless	
18-8 bundles	160.00 to 165.00
18-8 turnings	95.00 to 100.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 busheling	27.00 to 28.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	33.00 to 34.00
Structural and plate, 2 ft and under	35.00 to 36.00
Rails 2 ft and under	46.00 to 47.00
Scrap rails, random lgth.	36.00 to 37.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
Foundry steel, 2 ft.	29.00 to 30.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	13.50 to 14.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	35.00 to 36.00
Rails random lengths	38.00 to 39.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	38.00 to 39.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	30.00 to 31.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	53.00 to 54.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Bar crops and plate	41.00 to 42.00
Structural and plate, 2 ft.	40.00 to 41.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	44.00 to 46.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00
Stove plate	38.00 to 39.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	29.00 to 30.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	15.00 to 16.00
Mixed bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00
Stainless	
18-8 prepared solids	150.00 to 155.00
18-8 turnings	75.00 to 80.00
430 prepared solids	55.00 to 60.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	27.00 to 28.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	27.00 to 28.00
Mixed cupola cast.	30.00 to 31.00
Automotive cast.	40.00 to 41.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	75.00 to 80.00
430 bundles and solids	65.00 to 70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	24.00 to 25.00
Machine shop turn.	3.00 to 4.00
Shoveling turnings	8.00 to 9.00
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00

San Francisco

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	21.00 to 22.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	.... 12.00
Cast iron borings	.... 12.00
No. 1 cupola cast.	.... 45.00

Los Angeles

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	21.00 to 22.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	.... 12.00
Shoveling turnings	.... 12.00
Cast iron borings	.... 12.00
Elec. furnace 1 ft and under (foundry)	41.00 to 42.00
No. 1 cupola cast.	41.00 to 42.00

Seattle

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 2 bundles	18.00 to 19.00
No. 1 cupola cast.	.... 34.00
Mixed yard cast.	.... 29.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

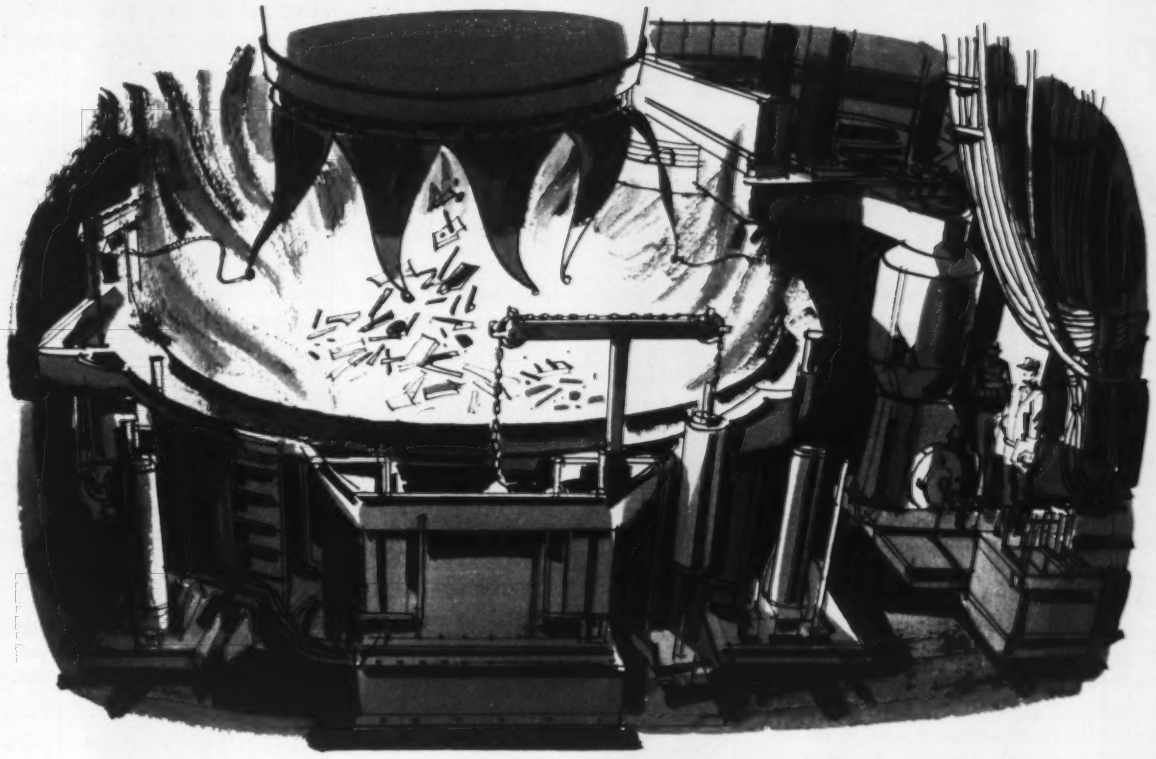
No. 1 hvy. melting	.... $27.00
No. 2 hvy. melting cut 3 ft and under	.... 26.00
No. 1 dealer bundles	.... 28.00
No. 2 bundles	.... 21.50
Mixed steel scrap	.... 19.00
Bush., new fact., prep'd.	.... 27.00
Bush., new fact., unprep'd.	.... 22.00
Machine shop turn.	.... 8.00
Short steel turn.	.... 12.00
Mixed bor. and turn.	.... 12.00
Cast scrap	.... 32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	.... $33.00
No. 2 hvy. melting	.... 30.00
No. 2 bundles	.... 21.00
Machine shop turn.	.... 12.00
Shoveling turnings	.... 15.00
Cut structural plate 2 ft & under	$42.00 to 43.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	28.00 to 29.00

DANGEROUS INTRUDERS IN IRON AND STEEL SCRAP



COPPER . . . FRIEND OR FOE?

Because it is one of the most adaptable of metals, copper can be used either in its pure state or as an alloy with a wide variety of other metals.

The steel industry values copper as an element in certain steel compositions because it acts as a strengthening agent. Its presence also increases the resistance of steel to the harmful effects of atmospheric corrosion. These qualities make copper an important element in the weight-saving, high strength low alloy steels. For such steels, copper is a friend.

However, if copper enters the furnace as an unknown part of the charge, it becomes an undesired residual element. It will alloy with the molten metal, making the finished steel unfit for its intended use. In certain ranges of composition, it will impair the response of steel to fabrication by hot working or deep drawing. In the electric furnace, it is particularly undesirable. The presence of this non-oxidizable element may make it necessary to divert, or possibly force the scrapping of the entire heat.

When any of these situations occur, copper is a definite foe.

For guaranteed analysis of stainless and alloy steel scrap, look to Luria. Our personnel, equipment and strategically located facilities are specifically geared to work for you. We welcome your inquiry.

Luria Brothers and Company, Inc.

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Freed Silver Hits A New High

Prices of silver hit a 40-year high after President's action to restore a free market.

Next move is up to Congress where an East-West debate is shaping up.

■ Reactions to President Kennedy's moves to return silver to a free-market basis were not long in coming.

By last week end, prices had risen more than 9¢ an ounce to the highest level in more than 40 years. Consumers generally approved the Administration program to put silver on a free-market basis. Producers applauded the move, but statements on increases in mining operations were scant.

Wait for Congress—A battle is likely when Congress reconvenes next month to vote on portions of the action which require legislative approval. This Washington contest —as well as silver's future in general—revolve around the question of price.

In asking for a free market in silver, the President took these steps:

(1) Asked Congress to repeal the Silver Purchase Act requiring the Treasury to buy silver, if offered, at 90½¢ an ounce. This, in effect, put a floor on silver prices.

(2) Suspended sales of Treasury silver, which had been moving out of depleting stocks at 91¢ an ounce.

(3) Requested that Congress repeal a 50 pct tax on the profits made on transfers of silver bullion. This would allow free trading in silver, as now takes place in other commodities.

(4) Directed that silver for coinmaking be obtained by gradually withdrawing $5 and $10 silver certificates from circulation.

(5) Announced he will ask Congress to authorize Federal Reserve Notes in amounts of $1 and $2, replacing the silver certificates now in use.

East vs. West—The President's requests could provoke a battle of East vs. West when Congress reconvenes. Reaction of silver-state congressmen is best expressed by Senator Alan Bible (D-Nev.): "The Administration's decision is highly gratifying. The action will be advantageous to the lead-zinc industry where silver is an important by-product."

On the other hand, Senator Thomas J. Dodd (D.-Conn.) has been among eastern congressmen urging the Administration to resist demands of Western legislators. He has said, "The danger facing the silver industry over the years has been due to government subsidy of the silver mining industry which has so inflated the price of silver and so threatened the availability of silver that the end users have barely managed to keep going."

The Senator believes the demands threaten the jobs of several thousand Connecticut workers employed in silver using industries.

Stocks Low — Depletion of the Treasury's silver stock was the major factor in last week's action. Until mid-1959, the Treasury had a stock in excess of 210 million ounces of free silver. Through open market sales to industry, this stockpile shrank by this November to about 43 million ounces.

Industrial demand for silver has been growing steadily. It has heavy use in photographic and X-ray film, for electrical contacts and in batteries. In addition, it's used in brazing alloys, in ceramics, in plating, and as a catalyst.

U. S. mined output dropped from 38.7 million ounces in 1956 to 30.7 million ounces last year, according to Bureau of Mines figures. World output of silver in 1960 is estimated at 239,500,000 ounces.

Lead-Zinc Prices

Price advances came last week in two metals normally associated with silver—lead and zinc.

Both advances were important as the first upward price moves for lead and zinc in some time.

Custom smelters increased the price of refined lead at New York to 10.25¢ a pound, the first advance since August, 1959. Prime Western zinc at East St. Louis rose 0.50¢ to 12¢ a pound, when several suppliers announced the change. Others are expected to take similar action.

Tin Prices for the Week

November 28—122.25; November 29—122.125; November 30—122.125; December 1—122.25; December 4—122.125*.
*Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	24.00	26.00	9/25/61
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.05	9.80	11/30/61
Lead, N. Y.	10.25	10.00	11/30/61
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	12.00	11.50	11/30/61
Zinc, N. Y.	12.50	12.00	11/30/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 175.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb. f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)
("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	47.4	46.4	45.4	44.4
5052	54.8	52.0	49.8	46.8
6061-0	53.0	50.3	48.4	47.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.8
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 3/4
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated
(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	96.9	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Ba.	54.73	55.02	54.67	58.34
Mang. Ba.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb, f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb) ..$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95¢ to 36.95¢
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz. ..$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz. ..$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 100.75
Thorium, per pg $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 32.00
No. 120 ..... 31.25
No. 123 ..... 30.50
80-10-10 ingot
No. 305 ..... 36.00
No. 315 ..... 33.75
88-10-2 ingot
No. 210 ..... 43.75
No. 215 ..... 40.50
No. 245 ..... 35.75
Yellow ingot
No. 405 ..... 27.50
Manganese bronze
No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
0.30 copper max. 23.25-23.75
0.60 copper max. 23.00-23.50
Piston alloys (No. 132 type) ..25.00-26.00
No. 12 alum. (No. 2 grade) ..21.25-21.75
108 alloy 21.75-22.25
195 alloy 24.25-24.75
13 alloy (0.60 copper max.) ..23.00-23.50
AXS-679 (1 pct zinc) 21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 22.75-23.75
Grade 2—92-95% 21.50-22.50
Grade 3—90-92% 20.50-21.50
Grade 4—85-90% 19.50-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24⅜	24
Mang. bronze	19¼	
Free cutting rod ends		18½

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¾
No. 2 copper wire 24¾
Light copper 22½
•Refining brass 23½
Copper bearing material 22½
•Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¾
No. 2 copper wire 24¾
Light copper 22½
No. 1 composition 24
No. 1 comp. turnings 23½
Hvy. yellow brass solids .... 17 —17⅛
Heavy yellow brass turnings 16 —16½
Radiators 20

Aluminum

Mixed old cast. ..... 12 —12½
Mixed new clips ..... 14 —14½
Mixed turnings, dry ..... 12½—13½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 23 —23½
No. 2 copper wire ..... 21 —21½
Light copper ..... 18¾—19¼
Auto radiators (unsweated).. 16 —16½
No. 1 composition ..... 20 —20½
No. 1 composition turnings.. 19½—20
Cocks and faucets ..... 16½—17
Clean heavy yellow brass ... 14¼—14½
Brass pipe ..... 16¼—16¾
New soft brass clippings .... 17¾—18¼
No. 1 brass rod turnings .... 15½—16

Aluminum

Alum. pistons and struts .... 6½— 7
Aluminum crankcase ..... 9 — 9½
1100 (2s) aluminum clippings 11¼—11¾
Old sheet and utensils ..... 9 — 9½
Borings and turnings ..... 4¼— 4¾
Industrial castings ..... 8¾— 9¼
2020 (24S) clippings ..... 10 —10½

Zinc

New zinc clippings ..... 5 — 5¼
Old zinc ..... 3 — 3¼
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1¾— 2

Nickel and Monel

Pure nickel clippings ..... 56 —58
Clean nickel turnings 43
Nickel anodes ..... 60 —62
Nickel rod ends ..... 56 —58
New Monel clippings ..... 25 —27½
Clean Monel turnings ..... 23 —25
Old sheet Monel 22
Nickel silver clippings, mixed. 20
Nickel silver turnings, mixed. 16

Lead

Soft scrap lead ..... 6¼— 6½
Battery plates (dry) ..... 2 — 2¼
Batteries, acid free ..... 1¼— 1½

Miscellaneous

Block tin ..... 90 —92
No. 1 pewter ..... 64 —66
Auto babbitt ..... 45 —46
Mixed common babbitt ..... 9½—10
Solder joints ..... 13¾—14¼
Small foundry type ..... 8 — 8½
Monotype ..... 8¼— 8¾
Lino. and stereotype ..... 7½— 7¾
Electrotype ..... 7 — 7¼
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 1 — 1½
Electro dross ..... 1¾— 2¼

(Effective Dec. 4, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R5,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

Electro-galvanized-plus galvanizing extras

(Effective Dec. 4, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Cokes▲ *1.25*-lb. base box	Electro▲▲ *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated m/g. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ▲COKES: 1.50-lb. add 25¢. ▲▲ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3, Y1.*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢. †† 7.425 at Sharon; Niles is 7.225.

(Effective Dec. 4, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, SI5*		7.70 *B5*	6.725 *B3,R3, SI5*	9.025 *B3,B5, SI5*	8.30 *B3*	5.30 *B3*				8.00 *W6, SI5*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, W13*		9.025 *A5, C13,W13*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,W13*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, SI2*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Dec. 4, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
W13 Western Cold Drawn Steel, Div. of Standard Screw Co., Elyria, O.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24				
Baltimore	$.10	9.60	10.36	10.16	11.35	9.70	9.95	9.75	11.80	17.48	16.48	21.58	20.83
Birmingham		9.11	11.00	11.39	10.10	9.06	9.12	8.91	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.87	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98				20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	8.20	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.63	12.85	18.59	16.68	22.69	21.04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.84	17.24	16.24	21.34	20.49
New York**	.10	9.91	10.44	11.64	13.67	9.99	10.45	10.15	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia	.10	9.90	10.10	10.99	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.65	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.65	22.15
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.63
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64		16.69	21.79	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 1.3c zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier: [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Dec. 4, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	F dry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	65.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct; up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	11

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.88	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Dec. 4, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	42.25	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7.* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S15,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3,* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *I4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7,* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2,* Detroit, *R5;* Reading, Pa., *C2,* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1;* Claymont, Del; *P2.*

Forging billets: Ambridge Pa., *B7;* Midland Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Annld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	...	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.70
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

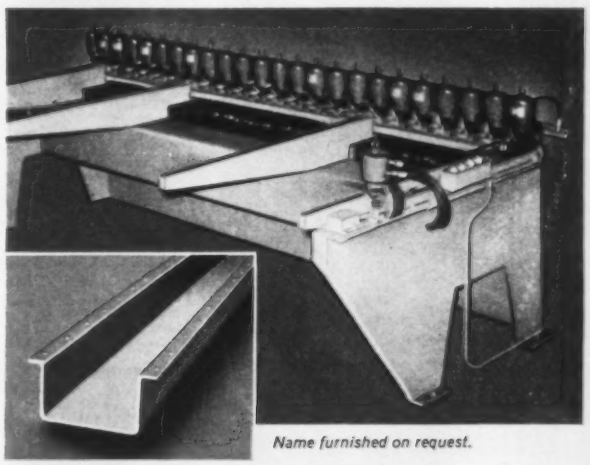
52 HOLES PUNCHED IN 12 SECS.

with Hydraulic Gang Punching Set-ups!!!

PREVIOUS METHOD: 1/4" plate sheared to size. Layout man premarked 52 holes. Each and every 7/16" dia. hole punched individually. Time to punch each hole was about 10 secs. Total punching time used — Approx. 9 mins.

PRESENT METHOD: 1/4" plate sheared to size. Placed in GANG-PUNCH set-up. 26 holes 7/16" dia. punched simultaneously. Time to punch 26 holes, 6 secs. 12 secs. for 52 holes. CONSIDER TREMENDOUS SAVINGS . . . 12 secs. as against 9 mins.

- ONE TO -?- HOLES PUNCHED AT ONCE.
- NO LIMIT TO LENGTH OF SET-UP.
- UP TO 1" ROUND IN 1" STEEL STOCK.
- SINGLE OR MULTIPLE PUNCHING.



Name furnished on request.

W A WHITNEY HYDRAMIC Metalworking Machines

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FERROALLOY PRICES

NOTE: Prices of Boiler Tubes, Clad Steel, C-R Spring Steel, Electrical Sheets, Electrodes, Electroplating Supplies, Metal Powders, Rails and Track Supplies, and Refractories are published in alternate issues.

Ferrochrome

Base prices per lb of contained chromium, carload lots of lump material in bulk, unless noted.

High-Carbon

4.00-6.00% C, 55-63% Cr, 8-12% Si, .03% max S	23.00
4.00-7.00% C, 67-71% Cr, 1-2% Si..	24.00
4.25% max C, 58-65% Cr, 1% max Si, .03% max S	24.00
5.25% max C, 58-65% Cr, 3% max Si, .03% max S	22.00

Low-Carbon

2.00% max C, 65-71% Cr, 2% max Si	32.50
.75% max C, 67-73% max Cr, 2% max Si	33.00
.025% max C, 68-73% Cr, 2% max Si	33.50
.05% max C, 67-73% Cr, 2% max Si	33.00
.05% max C, 63-67% Cr, 4-6% Si...	32.50

Bricks or Pellets

.025% max C, 63-68% Cr, 4-7% Si..	32.50
.025% max C, 68-71% Cr, 2% max Si	33.00
.010% max C, 63-68% Cr, 4-7% Si..	33.00
.010% max C, 68-71% Cr, 2% max Si	33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Ferrochrome Silicon

Carloads, delivered lump, per lb of material.

39-41% Cr, .05% max C, 42-45% Si.	11.50
44-47% Cr, .15% max C, 37-39% Si.	12.60

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (¼" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.70
Ton lots packed in bags	16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	$98.00	$96.00	$100.50
19-21%	100.00	98.00	102.50
21-23%	102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk	34.25
Ton lots, palletized	36.25
250 to 1999 lb	39.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn (Bulk)	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk	11.60
Ton lots, packed	13.25
Carloads, bulk, delivered, per lb of briquet	14.00
Briquets, packed pallets, 2000 lb up to carloads	16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.50	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
		90% Si....	20.00

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective Dec. 4, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.63

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.89

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Vanadis, O., O., freight allowed, ton lots, per lb contained Ti $1.35
Less ton lots (200 lb and up) $1.37

Ferrotitanium, 30% low carbon, 0.10% C max., 27-32% Ti, Vanadis, O., freight allowed, per lb contained Ti, ton lots $1.35
Less ton lots (200 lb and up) $1.40

Ferrotitanium, 1-3% Carbon, 17-20% Ti, f.o.b. shipping point, freight allowed, carload per net ton $250.00
Ton lots $260.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.45 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.62
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.59

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corboram, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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New materials, new techniques have opened broad horizons for perforated materials in industrial design.

Texturing of perforated metals offers a dramatic opportunity to increase visual appeal while adding structural strength.

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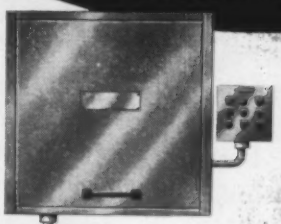
SALES ENGINEERING DEPARTMENT

Sun SHIPBUILDING & DRY DOCK COMPANY
CHESTER, PA.

LIMA Selectro-Shift DRIVES



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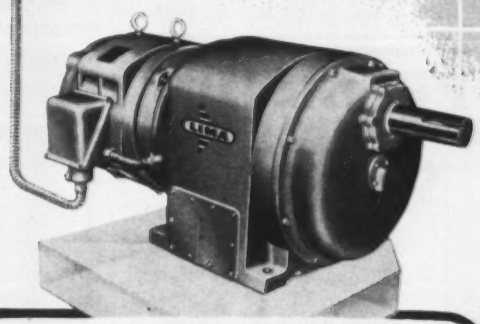

20HP 25HP 30HP 40HP THREE SPEED
with
REMOTE CONTROL PANEL
6 or 3 speed

- incorporates gear sets . . . *no belts!*
- hydraulic clutches activated by electric solenoids.
- can be shifted to any of six speeds *while running under full load!*
- forward or reverse drive.

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general sales manager

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- GEARMOTORS
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- SHAFT MOUNT REDUCERS
- GENERATORS
- GEAR REDUCERS
- GREEN SEAL MOTORS

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LIMA, OHIO

12000 CFM NEW VANEAXIAL FLOW FANS

Sturtevant A-12, 3" Static Pressure 2 Speed Westinghouse AC Waterproof Motor, HP 10-3, 3 Phase 60 Cycle 440 Volts, Complete with Magnetic Controller and Spares, F.O.B, Trenton, N. J., and Ogden, Utah.

$450.00 EACH

(Replacement Cost $2,000.00)

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Detroit Market Has Spirited Trading

Used machinery business climate is healthy and there's more optimism among dealers.

Increased action in the fourth quarter points to good prospects for early 1962.

▪ Used machinery activity around Detroit is showing more spirit during the fourth quarter than earlier this year. And the impression gained from talks with dealers is that more headway will be made throughout the early stages of 1962.

Two Views—There are those who are down in the dumps over the current business pace. But more are expectant, or at least hopeful, that the turn into the new year will be more pleasant and profitable than a year ago.

The mixed attitudes prevalent throughout the Motor City used machinery trade concerning the near term can be seen through these statements by various dealers:

"Sales are spotty," claims one dealer, "although we're somewhat busier now than we were earlier this year. I'd say business is improving and the outlook for early next year is pretty good."

Pace Quickening—A competitor complains of "slow sales" and the fact that 1961 will be worse than 1960. "But in the past couple weeks there's been a little more action," he says.

A third dealer anticipates a pickup in 1962 because "there's a bit more optimism in the air." His inquiries are rising.

It seems it is simply a brighter allround business climate.

Automobile's Influence — However, one reason may be a rising automobile business. Increased car manufacturing generally will bring an increase in used machinery buying. And the auto industry's output in the fourth quarter will be close to record proportions, with indications it will keep moving at above average levels at least into spring.

Tool and die programs are heavier this winter than they have been in several years, too, which is another plus factor in the used machinery market.

Detroit used machinery warehouses are loaded with stock. Inventories are high and practically all varieties of machines abound.

Best Sellers—High on the popularity list, as far as drawing interest, are metalworking machines such as brakes and shears. There are profits to be made today, "if you stay away from the garbage," says one dealer bluntly. He says business can be good if you deal in machines that are in almost precision shape. High production equipment is of value, he points out, but it must be fairly new, not more than 15 years old, and in good condition.

There has not been much change in prices. They have been stable and good. Ranking high in popularity are kellers, mills lathes and boring mills.

Auction Sales — Auctions have been picking up recently, involving large amounts of machinery. So much is on the block, says an auctioneer, that dealers are about the only ones who can absorb all of it, and they are getting it for pretty attractive prices.

ROLLING MILLS—STEEL WORKS EQUIPMENT

1—38" CONTINUOUS HOT STRIP MILL.
1—40" 2-HIGH BLOOMING MILL.
1—3-HIGH PLATE MILL, 40" & 28½" x 112".
1—32" & 20" x 56" 3-HIGH SHEET MILL, with motor driven screwdown and pre-set controls.
1—25" & 42" x 66" HOT STRIP MILL, 4-high.
2—29" 2-HIGH HOT SHEET MILLS with tables.
1—26" COLD SHEET MILL TRAIN, 5 stands.
1—16" x 28" COLD MILL, 2-high, 200 HP drive.
2—12¾" x 15¾" COLD MILLS, 2-high, roller bearings, 100 HP motors.
2—10" x 14" 2-HIGH COLD MILLS, 100 HP DC drives, with one coiler.
1—16" BAR MILL, 3-high, single stand, NEW.
1—10" BAR MILL, 3-high, 5 stands, with two 16" 3-high roughing stands, drives, tables, flying shear, double mechanical hot bed.
1—9" BAR MILL, 3-high, five stands.
1—VERTICAL OPEN-SIDE BAR SHEAR, 28".
2—SQUARING SHEARS for ¼" x 158" sheets.
1—STRAIGHTENER, SUTTON NO. 1 SPECIAL, for bars ¼" to 1½", tubes ¼" to 2".
1—LEVELLER FOR ¼" PLATES, 9 rolls, 9" dia. x 108" face, 20 HP motor.
1—LEVELLER FOR SHEETS, 17 rolls, width 66", rolls 4½" dia., 25 HP motor.
1—AUTOMATIC SQUARING SHEAR UNIT for sheets, 160" side cut, 62" end cut.
1—ROLL GRINDER, 38" x 12', heavy duty, crowning, concaving and tapering.
1—50" ROLL LATHE, enclosed headstock, tailstock, 50 HP motor, 19' between centers, bed length 31'.
1—ROLL LATHE, enclosed headstock, rolls 14" to 26" dia., 30 HP motor, bed length 21'.
2—42" WIDE COIL BUILD-UP LINES.
1—3000 HP GEAR DRIVE, ratio 2.68 to 1.
1—3000 HP GEAR DRIVE, ratio 4.6 to 1.
1—1600 HP GEAR DRIVE, ratio 10 to 1.
1—400 HP GEAR DRIVE, ratio 8.2 to 1.
1—4000 HP MOTOR, 11200/3/60, 510 RPM.
1—3500 HP MOTOR, 11000/3/60, 514 RPM.
1—1600 HP MOTOR, 2200/3/60, 270 RPM.
1—400 HP MOTOR, 2300/4600/3/60, 450 RPM.
1—7½-TON SOAKING PIT CRANE, 85' span.

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AUTOMATIC, 14" 4 spindle Bullard Type RU Cintin-U-Matic
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DRILL, MULTIPLE, 36 spdl. No. 4 BL multiple
DRILL, RADIAL, 5' 13" col. Cincinnati Bickford Super Service
DRILL, UPRIGHT, 22" No. 221½ Barnes box column
DRILL, 5 spdl. Allen Mod. 3VCCE auto. 6 sta., 48" dia. index table '54
GEAR ROUGHER, No. 7 Gleason Revex hyd.
GEAR HOBBER, No. 7A Lees Bradner, '52
GEAR GENERATORS, No. 5B Sykes Farrel Birmingham (3)
GRINDERS, CYLINDRICAL, 16" x 36" Norton type C plain, 20 HP
GRINDER, INTERNAL, No. 74 Heald hyd. cross slide headstock
GRINDER, SURFACE, 30" Mod. 18 Blanchard rotary
GRINDER, model 2TR Springfield, vert., univ., hyd.
GRINDER, THREAD, 6" x 15" Mod. TG 615 Jones & Lamson
GRINDER, THREAD, 6" x 36" Mod. TG 636 Jones & Lamson auto (2)
HONE, No. 705-2 Micromatic two spdl., vert., hyd.
LAPPER, No. 821-2 Micromatic Microflat '55
LATHE, AUTO., 20" x 25" cc Fay, 20 HP, '42
LATHE, ENGINE, 25" x 72" cc Axelson, hy. dy., hard ways, 20 HP flange MD
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An asterisk indicates that a booklet, or other information, is offered in the advertisement.

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A

*Abell-Howe Co. 163
*Acme Manufacturing Co. 161
Ajax-Magnethermic Corp. 12
*Allegheny Ludium Steel Corp. ..18-19
Allentown Pneumatic Gun Co. 156
Alliance Machine Co. 102
*Aluminium Limited Sales Inc. ..48-49
Amchem Products, Inc. 167
American Optical Co. 149
*American Pulverizer Co. 142
*American Shear Knife Co. 71
*American Society for Metals ...30-31
*American Tool Works Co. 10
Ansco Div General Aniline & Film Corp. 22
Arcos Corp. 138-139
*Arwood Corp. 68-69
Avey Div. 160

B

Babcock & Wilcox Co., Tubular Products Div. 4
Baldt Anchor, Chain & Forge Div. 186
Behr-Manning Co. 127
Belyea Co., Inc. 185
Bertsch & Co. 154
Bessemer & Lake Erie Railroad Co. 107
*Bethlehem Steel Co. 1
Birdsboro Corp. 141
*Black & Decker Mfg. Co. 55-56
Blaw-Knox Co., Foundry & Mill Machinery Div. 155
Bound Brook Bearing Corp. of America 77
Buffalo Forge Co. 50

C

Capital Equipment Enterprises, Inc. 186
*Carborundum Co. 42
Carco Industries Inc. 186
Carlstrom Pressed Metal Co. 186
Cattie, Joseph P. & Bros. Inc. 154
*Chambersburg Engineering Co. 157
*Chicago Rawhide Mfg. Co. 110
*Cincinnati Shaper Co. 78
*Circular Tool Co. 108
*Clements Mfg. Co. 158
*Cleveland Worm & Gear Div., Eaton Mfg. Co. 82
Columbia-Geneva Steel Div., United States Steel Corp. 112
Consumers Steel & Supply Co. 187
Cox & Sons Co. 186
Crucible Steel Casting Co. 171
*Cutler-Hammer Inc. 171

D

Davidson Pipe Co. Inc. 184
*Detroit Steel Corp. 33
*Dodge Manufacturing Corp. 54
Dow Chemical Co. 93

E

Eastern Scrap & Salvage Corp... 184
*Eastern Tool & Mfg. Co. 171
Electrode Div. Great Lakes Carbon Corp. 29
Electro Lift, Inc. 158
Erie Bolt & Nut Co. 109
Eveready Supply Co. 185

F

Fairbanks, Morse & Co. 8
Falk Machinery Co. 186
Fellows Gear Shaper Co. 100
Foster, Frank B. Inc. 185
Foster, L. B., Co. 185
Foxboro Co. 79

G

General Aniline & Film Corp. 22
General Electric Co., Direct Current Motor & Generator Dept. 72
General Electric Co., Large Motors & Generators 44-45
Gilbert Merrill Steel Corp. 187
*Gisholt Machine Co. 37
Goss & DeLeeuw Machine Co. 154
Great Lakes Carbon Corp. 29

H

*Haynes Stellite Co., Div. Union Carbide Corp. 51
Heat & Power Co., Inc., ... 184, 185
*Horsburgh & Scott Co. 143
*Houghton, E. F. & Co. 40
Hughes, Arnold, Co. 185, 187
Hyde Park Foundry & Machine Co. 106
Hyman, Joseph & Sons 185
Hyster Co. 94

I

Indeck Power Equipment Co. 186
International Business Machines 64-65
Ipsen Industries, Inc. 47

J

Johnson Steel & Wire Co., Inc. 66-67
Jones & Laughlin Steel Corp., Stainless & Strip Div. 135

K

Kaiser Engineers 91
Kaydon Engineering Corp. 137
*Kennametal Inc. 20
Keystone Forging Co. 186
Kidde, Walter & Co., Inc. 151
King Foundries, Inc. 186
Kingsbury Machine Tool Corp. 63

L

Landis Machine Co., Inc. 46
Lima Electric Motor Co., Inc. 183
Lincoln Electric Co. 58-59
Linde Co., Div. Union Carbide Corp. 128-129, 152, 158, 188
Lodge & Shipley Co. 148
Lucas Machine Div., New Britain Machine Co. 75-76
Luria Bros. & Co., Inc. 173

M

*Mahon, R. C., Co. 43
*Malleable Castings Council ..130-131
*Manco Mfg. Co. 146
*Marchant, Geo. F., Co. 160
Mesta Machine Co. Inside Front Cover
Metal & Thermit Corp. 98
Midwest Steel Co. 52
Miles Machinery Co. 185
Minneapolis-Honeywell Regulator Co. 34-35
*Mundt, Chas. & Sons 183

N

National Business Bourse, Inc.... 186
National Machinery Co. 32
National Steel Corp. 52
New Britain Machine Co., Lucas Machine Div. 75-76
New Departure Div., General Motors Corp. 14
New England High Carbon Wire Corp. 152
New England Pressed Steel Co. ... 186
*Niagara Machine & Tool Works . 41
Nippon Kokan K. K. 57

O

*Ohio Crankshaft Co. 132
*Owens-Corning Fiberglas Corp. . 17

P

Pangborn Corp. 140
Parker Rust Proof Co. 145
*Pennsalt Chemicals Corp. 36
*Philadelphia Gear Corp. 6
Pittsburgh Steel Co. 66-67

R

*C. A. Roberts Co. 144
Roebling's, John A. Sons, Div. Colorado Fuel & Iron Corp. ... 73
Rosedale Foundry & Machine Co. 186
*Ruthman Machinery Co. 23

S

Seaboard Steel Co., Inc. 185
Selas Corp. of America 60-61
Shell Oil Co. 164
Smith, Thomas Co. 186
Southern Screw Co. 21
*Spaulding Fibre Co., Inc. 62
St. Lawrence Columbium & Metals Corp. 154
Stamco, Inc. 162
Sun Shipbuilding & Dry Dock Co. 183
Surface Combustion, Div. Midland Ross Corp. 70
Swift-Ohio Corp. 156
Swindell-Dressler Corp. 26-27
Sylvania Electric Products, Inc. .. 24

T

Tennessee Coal & Iron, Div. United States Steel Corp. 112
*Texaco Inc. 153
Townsend Co. 28
Tractor & Equipment Co. 186

U

*Ulbrich Stainless Steels 169
Union Carbide Corp., Haynes Stellite Div. 51
Union Carbide Corp., Linde Co. Div. 128-129, 152, 158, 188
United Engineering & Foundry Co. 53
United States Steel Corp. ..38-39, 112
United States Steel Export Co. ... 112
Universal Grinding Corp. 184
Universal Machinery & Equipment Co. 185

V

*Vascaloy-Ramet Corp. 74
Verson Allsteel Press Co. Back Cover

W

Wallack Bros. 187
*Washington Steel Corp. 80
Weatherly Foundry & Mfg. Co. ... 186
Weirton Steel Co. 52
Weiss, B. M., Co. 186
Weiss Steel Co. Inc. 187
*Wheelabrator Corp. 25, 159
Wheelock, Lovejoy & Co., Inc. .. 147
Whitney, W. A., Mfg. Co. 181
Wilcox Forging Corp. 186
*Wilson, Lee, Engineering Co., Inc. ..... Inside Back Cover
*Wood, R. D., Co. 16

Y

*Yoder Co. 105

CLASSIFIED SECTION

Clearing House 184-186
Contract Manufacturing 186
Employment Exchange 186
Equipment & Materials Wanted . 187

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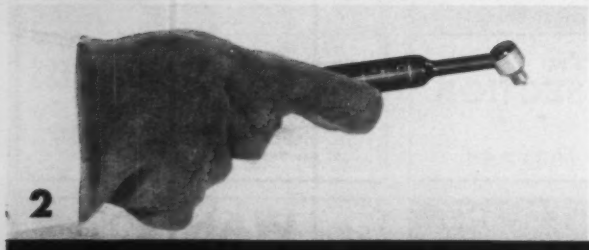

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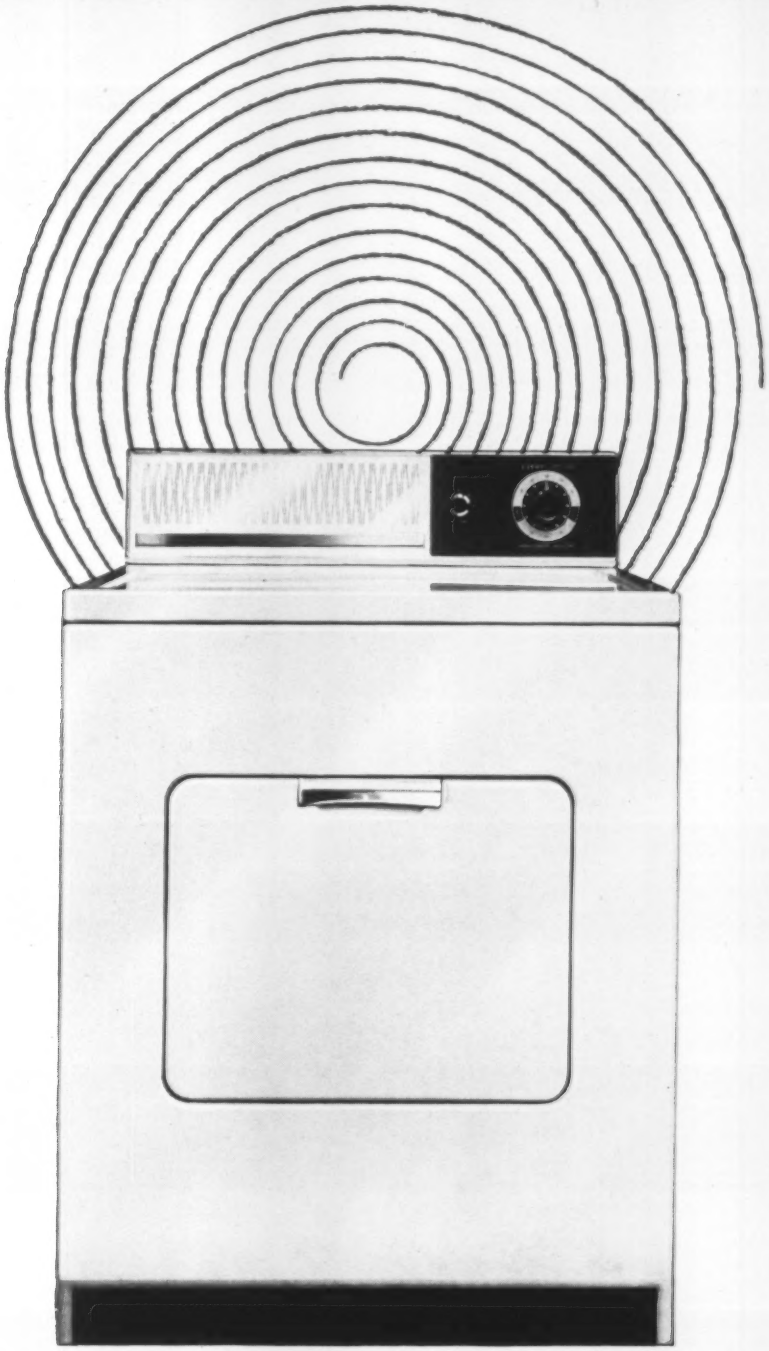

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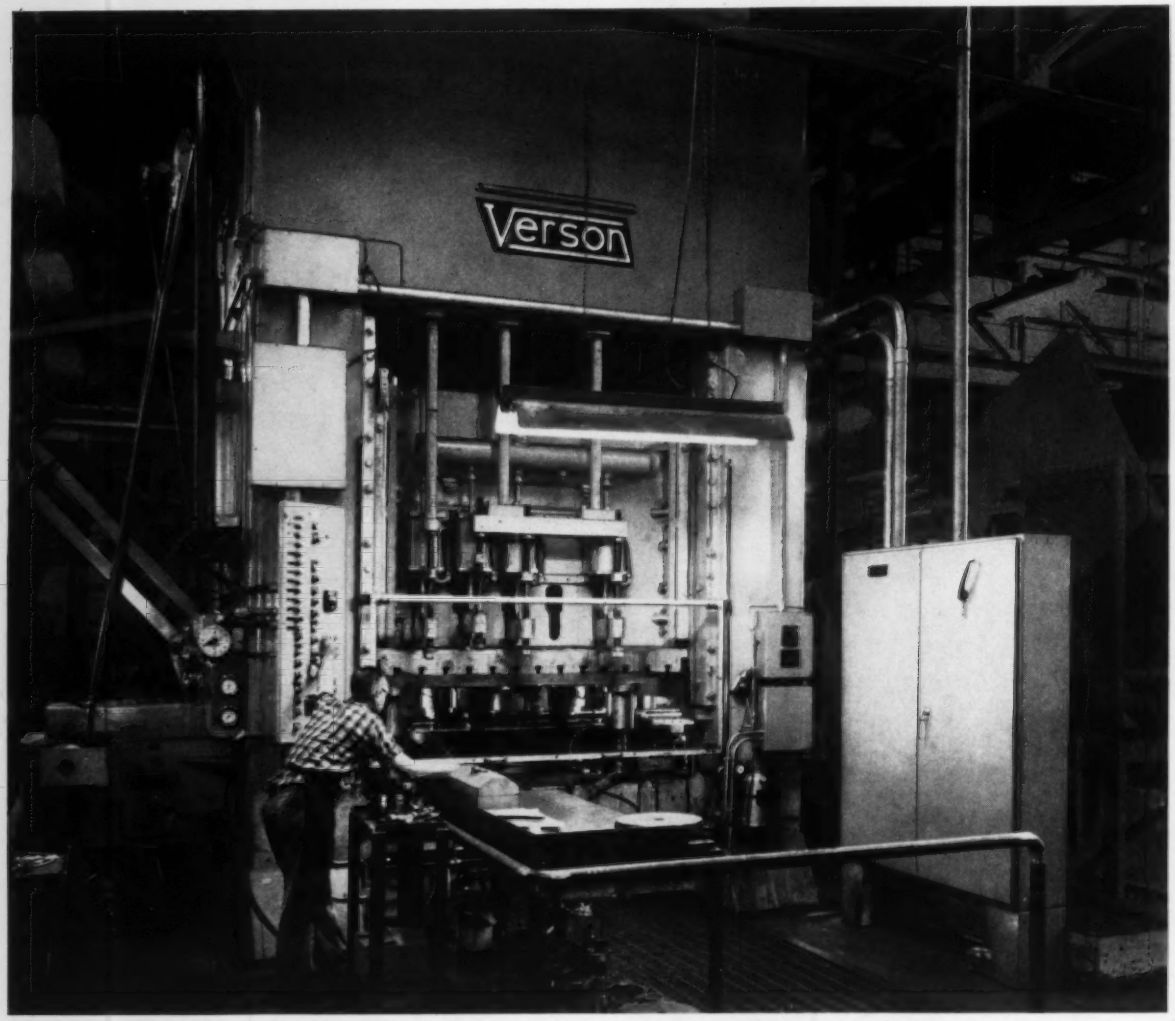

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